

ANALYSES OF MIXED-USE BUILDING DEVELOPMENTS AND THEIR POSSIBLE  
IMPACTS IN IVORY COAST



by

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ANALYSES OF MIXED-USE BUILDING DEVELOPMENTS AND THEIR POSSIBLE  
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## **ABSTRACT**

### **ANALYSES OF MIXED-USE BUILDING DEVELOPMENTS AND THEIR POSSIBLE IMPACTS IN IVORY COAST**

The architectural environment is a kind of ecosystem where different types of building are in correlation to create a built environment. Each system with its own organization and diversity can be referring to a neighborhood, a city, a country or even a continent. This thesis examines in general of the subject of mixed-use building as a building typology, and particularly about the impacts that can be expected from this typology if imported in a system where it does not exist yet. In other word this study analyzes mixed-use building configurations into different architectural environment where it already exists and try to figure out the adequate conditions by what the typology can be transpose in another architectural environment where it can bring solution and diversity.

The different architectural environment references in this thesis are the countries classification groups which are developed country, developing country and underdeveloped country. Developing countries, where the typology is present but not well spread and underdeveloped countries where the typology is globally inexistent. Six buildings have been analyzed, as two from each country category and the outcomes have been resumed in a table to allow direct comparisons. It can be retaining that mixed-use building in developed countries as present from long time are well elaborated and their benefits are clearly put in front, but reversely the challenges are bigger. This is partly because the general service level is already qualitative and well managed. Mixed-use building appears like a surplus or a choice between others. Oppositely in developing and underdeveloped countries the awaiting is bigger that the challenges. Because the general level of services is low and mixed-use building has important features that can palliate those misses. The case target of this thesis is Ivory Coast which is an underdeveloped country. After the different analyze and their interpretation, the thesis state on which criteria and condition the transfer of the typology can be possible into the Ivorian architectural ecosystem.

## ÖZET

### **KARMA KULLANIMLI YAPILARIN ANALİZİ VE FİLDİŞİ SAHİLİ'NDEKİ OLASI ETKİLERİNİN ARAŞTIRILMASI**

Mimari ortam, farklı tipolojilere ait yapıların ilişki içinde yer aldığı, mimari yapılı çevrenin tasarımı ile oluşan bir ekosistemdir. Kendi organizasyonu ve çeşitliliğiyle her sistem bir mahalleye, bir kente, bir ülkeye ve hatta bir kıtaya özgü olarak şekillenebilir. Tez çalışması, günümüzde bazı coğrafyalarda yaygın olarak görülen bir yapı tipolojisi olan karma kullanımlı yapıları ve özellikle bu tipolojinin henüz mevcut olmadığı yerlere uygulanmasının olası etkilerini ortaya koymayı hedeflemektedir. Çalışmada karma kullanımlı yapılar, tasarım yaklaşımları ile değil, yapım amaçları ve işlevlerinin mimari ortama sunduğu katkıları bağlamında irdelenmiştir. Karma kullanımlı yapı tipolojilerinin, çağdaş bir yaklaşımla ele alındığında, işlevsel çeşitlilik sunma ve kontrollü yoğunluk yaratma amacıyla mimari yapılı çevreye katkı sunabildiği görülmektedir.

Tez çalışması kapsamında, farklı mimari ortamlarda bulunan karma kullanımlı yapılara ait detaylı bir tarihi araştırma yapılmış olup, analiz edilen tipolojinin tarihteki farklı mimari yaklaşımları örnekler ile irdelenmiştir. Karma kullanımlı yapıların, farklı sosyo-ekonomik koşullara sahip ülkelerdeki mimari katkıları, ülkeye ait küresel sınıflandırmalar kullanılarak tipolojinin çözüm ve çeşitlilik getirebileceği mimari ortamlara aktarımı için uygun koşullar analiz edilmiştir. Bu çalışma, sosyal, ekonomik ve çevresel duyarlılıklara sahip gelişmiş ülkeler ve gelişmekte olan ülkelerde karma kullanımlı yapıların mimari yapılı çevreye olan olumlu-olumsuz etkilerini irdelemekte, gelişmemiş ülkelerde ise çeşitli zorluklara rağmen karma kullanımlı yapıların mimari çevreye olası katkılarını da ortaya koymaktadır.

Çalışmada yapılan araştırma ve karma kullanımlı yapıların olası etkileri, gelişmemiş ülke sınıfında yer alan Fildişi Sahilleri bağlamında ele alınarak, alan çalışması olarak sunulmuştur. Karma Kullanımlı yapıların, Fildişi Sahilleri'nin mimari ortamına olası etkileri analiz edilerek, söz konusu tipolojinin hangi kriter ve koşullar ile gerçekleştirilebileceğine dair bir öneri sunulmaktadır.

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## LIST OF SYMBOLS/ABBREVIATIONS

API AWARDS	African Property Investment Awards
GDP	Gross Domestic Product
HDI	Human Development Index
IMF	International Monetary Fund
IPCC	Intergovernmental panel on climate change
MOCAA	Zeitz Museum of Contemporary Art Africa
MUD	Mixed-use development
NPPG	National planning practice guidance
TOD	Transit oriented development
WAN AWARDS	World Architecture News Awards
WAF AWARDS	World Architecture Festival Awards

## 1. INTRODUCTION

Architecture is the science of creating built environment. Perceived as an art, architecture is intrinsically linked to human evolution. In the history of humankind, civilizations are often identified by their architectural achievements. According to Vitruvius (a Roman architect of the 1st century) a good building should be designed and constructed by following three fundamentals: durability, utility and beauty [1]. From long time ago, durability has been incorporated in the principle of utility via the choice of material and structural systems. This is the main reason why architectural theories for centuries are based on either the form (beauty or structure) either the function (utility). By "function" there is two understanding; the first one is the function as related to the building itself and second function as related to the element that define the building. From the first understanding, functionalist architectural concepts say that the shape of a building should primarily be related to its intended function or purpose. Meaning that the form of the building will be given following the elements (the rooms, the circulation, the different space to predict...) needed and incorporate in the function of the building. From the second understanding, the building itself has a function which is defined as typology. For example, a building destined to human habitation (usually relatives) will be called as a house. House, housing, shopping mall, hotel and many others are building typologies. Building typology are as much varied as human activities are since the first human societies. This study mainly focused on mixed-use as a building typology.

Originally mixed-use is not among the building typology, as it doesn't have a fix purpose base on a determinate activity. Mixed-use building consists in mixing different typologies and council them in one building. But having two ore more use in a building doesn't automatically make this building a mixed-use one. If the purpose of the building is the main criteria to define a building type, there are also principles acting like rules. It is the same for mixed-use building, the ratio between the different uses and their relations are important. It will determine the primary usage of the building and will be called after it. It exists an infinity of base for mixed-use building, in fact it can be as much mix-use base building as it have of human activities. But this study has regrouped them in different categories and analyzed the most important as all of them cannot be explored. Residential,

commercial and leisure, industrial are considered by this study as the most significant mixed-use based type, because they regroup the different activities of the modern world. Residential for everything concerning habitation (hotel, apartment, house...), commercial (retail, shop, offices...) and leisure (cinema, theme park, experiences...) for economic activities and relates, and finally, industrial as a special category of buildings.

If mixed-use building is not a recently appeared typology in the humanity-built environment, its configurations have constantly evolved with the societies it belonged to. From the medieval time (5th to 15th century) where the premise of mixed-use building has been detected, to the recent globalization period (20th to 21th century), mixed-use building principles have changed and matured. Across the age major changes happened at key moments such Renaissance period (14th to 17th century) and Industrial Revolution (18th to 19th century) where mixed-use development almost disappears from society habit. Nowadays mixed-use building development plays an important role in the balance and diversity of different built environment according to their context. This impactful typology has many benefits but also many challenges which vary according to the configuration of the built environment it belong to. In this thesis, built environments are associated to country level of development. Many countries classification system exist, some reposing on GDP, some others on general economic activities, some also rely on less quantitative values as education, services and life experience. In the optic to council everything, this study chose to considerate Human Development Index (HDI) as countries classification system. HDI is a classification base on the capacity of countries to reinvest the economic fluctuation into education and services in order to enhance social blossoming, safety and richness for their population. This classification includes services, public and private infrastructures, life atmosphere and general chance of business fluctuation. Tree categories are retained in this study: developed countries, developing countries, underdeveloped countries. The classification put in developed countries group the countries with very high rate of HDI; in developing countries group those with high and medium HDI; and in underdeveloped countries group the ones with low HDI. If the focus of this study is the underdeveloped countries case, where the typology of mixed-use building is not developed, analysis are conducted on developed and developing countries also. The idea is to decorticate the benefits and the challenges of mixed-use building in different context before being able to propose mixed-use building as a solution to underdeveloped countries

such as Ivory Coast. Two case studies are conducted by countries classification group and the results will be interpreted to design a solution base on mixed-use building configuration.

The hypothesis of the study is: if mixed-use building typology is necessary and helpful for some societies and their built environments, it can also be substantial for Ivory Coast case. But being successful in some case mean that it also exists cases where mixed-use buildings may have some negative impacts.

This study in is development try to give answer to the following questions: What are the benefits of mixed-use building in a built environment? Why is mixed-use building successful in some cases and unsuccessful in others? How can mixed-use buildings help in the built environment of under-developed countries? How can the introduction of this typology be a sustainable import in the case of Ivory Coast? The aim of this study is to find out the probable configuration of mixed-use building typology that can be the most beneficial (as there is always a reverse side) for the society of Ivory Coast.

After a literature research about mixed-use building and underdeveloped countries, no study focusing on the typology as a possible impact for the building environment in underdeveloped country and specifically in Ivory Coast has been found. This study stands to bring new and authentic answer to the topic of mixed-use building as a solution for some built environments.

### **1.1. AIM AND SCOPE OF THE STUDY**

The study aims to explore mixed-use building typology's impacts and challenges in the societies it already exists and investigate the ways it can be beneficial for underdeveloped countries such as Ivory Coast.

To achieve its goal, the study will be restricted as far as possible to architectural expression of mixed-use building. But the singularity of the thesis linked to the possible impacts is undoubtedly referring to socio-economic layers of Ivory Coast; then some deviation will be allowed in order to identify properly the needs. By analyzing mixed-use building in different contexts and development, this study aims to propose workable architectural

solutions for Ivory Coast built environment. As mixed-use is a large concept and can be developed differently according to the needs and the context, this study will only focus on the development as a building typology. Horizontally or vertically developed mixed-use building developed in one building is the particularity of this thesis. Concept as urban development or others concept associating different buildings (even as part of the same project) will not be analyze. This thesis will examine methods used to integrate social, economic and environmental life concept into the architectural typology of mixed-use as a building.

## 1.2. LITERATURE REVIEW

Mixed-use building subject is a large and trending concept; sources about it are flooding but found precise and concise information for this study as quickly turn into a very complex and selective work. Shaping the outline with information from diverse sources, analyze them and using the only point that this study is concern with, without misrepresent the original files was a quiet rewarding task.

The main source of the study has been selected through the title keywords and what refer to it. On a first range the sources concern with the topic of mixed-use building (projects, development, history and future) and on the second range the others about social, economic and environmental life and their aspect through architectural reality. Also, some sources related to underdeveloped countries and particularly the target of Ivory Coast has empowered the singling process of the study. This study is mainly relying on academic sources as thesis (master and doctorate), research paper and publication. But some books and articles about them have also been helpful as they generally treat of open subject. The primary literatures for this study are details as following.

Many critics, articles and reference about *The Death and Life of Great American Cities* by Jane Jacobs have created interest on the book [2]. The book is crossing all the cities characters of the 1960's in United State. Describe by the New York Times as the one of the most influential and rigorously sensitive work on the history of city planning, the book is giving a very sharp critic of what makes American cities great or less livable on both the architectural and the social environment. The book has play an important role for the



understanding of the concept of neighborhood and their utilities in a city functionality; also, on the different conditions and importance of diversity in a city renewal cycle. The concepts it explores especially the needs of primary mixed uses, small blocks use and the need of concentration in the urban life have oriented the view of this study.

In another register but on the same topic of mixed-use building development, “Developing the Small, Mixed-Use Urban Project: A Contribution to Neighborhood Revitalization” by Jacqueline Morrissette Olivier, have been helpful [3]. Firstly, because at the time it was wrote (June 1988), mixed use development was not as trendy as today. The study is a Master of Architecture and Master of Science in real estate development designed at the Massachusetts Institute of Technology. The paper stipulates that the small mixed-use development occupied an important role in evolution of urban landscape. It advocates the prototype it designed in his lines will offer a considerable contribution in the built environment and its wellbeing of urban life. The focus of this work was to elaborate a prototype of small mixed-use projects applicable to abandoned urban context. As a revitalization project, the trust of the author is that architectural form and the activity of real estate development can together influence both the physical framework of neighborhoods and the community’s social and economic well-being. Creating a prototype of building as model for forsaken area was an immense challenge; too many criteria and variable are too be taken in consideration to create such a prototype. Every single neighborhood have is own needs to clarify in order to create a comfit group. As it mentions in the study’s conclusion, it can be more difficult to create an adaptable project than deriving workable solutions for the architectural design of a designated project. In the end, “Development of the Small Mixed-use, Particularly in Poor Inner-City Neighborhoods: A Contribution to Neighborhood Revitalization” is a good proposition to provide the sustenance for strong communities and healthy living neighborhoods, but a prototype is another challenge to clarify out. Analyzing this thesis permit to collect many information about mixed-use building statement after globalization in the different community’s social and environment life.

Another study entitled: *An Urban Design Approach to Cities in Developing Countries*, by Caleb Sackey; is a master thesis wrote in 2003 in Ghana at the Kwame Nkrumah University of Science and Technology [4]. The study helps first by the proximity of the target (neighbor country of Ivory Coast and underdeveloped country) and secondly in the

general aim of the study. In his approach to resolve Accra's (Ghana capital city) congestion (human and vehicular) problem, the urban sprawl, the housing shortage and the infrastructural problems, the author choose mixed-used development as solution. In the announcement of his problematic, the author said that Accra by its professionals in the building industry and stakeholders shouldn't wait the legal authorities to provide solution before the city collapse. For him the city is "dying" due to the break down in infrastructure and services. The study has also been helpful in the conceptualization of mixed-use building development in this part of the world where it's not common. But the study refers to mixed-use as a development project more than a building typology. In fact, mixed-use is there explored as an urban planning to give a sustainable growth and sprawl of the city of Accra. The study includes the design of a development project of 400.000 m<sup>2</sup>, in a suburban area of the city as a solution for a better planning. This part of the study was out of the concern of this thesis but have also help in the different approach of mixed-use than can provide solution for the case of Ivory Coast.

The thesis gravitation about possible risks and impacts of mixed-use building has been fueled by this third study. Mixed use in historic structures: a path to the future, a link to the past, is master thesis submitted to the Graduate Faculty of Historic Preservation at the University of Georgia (United States) [5]. The author William Butler in his study criticizes and evaluates mixed use building development. In fact, the study treats of the well-known mixed-use development problems of financing and proposed investment in historic structures as a solution for developers. This thesis has been helpful with the amount of information about economic risk and the different strategies to face them. Also, the fact that the hypothesis it is based on the link between historic heritage and the future by mixed-use development have a social and environmental aspect that has been exploited in this study.

Many others article, thesis, publication and others various sources have been enriching the study. But the pre-cited ones have played an important role on the general direction and the scope of this study.

### **1.3. METHOD OF THE STUDY**

The research design of this thesis is composed of different approaches; mainly base on qualitative techniques, this thesis also includes observational and interpreted methods.

Starting by an historical review of mixed-use building, this study chooses to examine all the elements and context that have shaped the building typology from the premise of its existence until nowadays. This chronology of mixed-use typology permits to understand why it is today a so impactful typology in the world's built environment.

After the idea of mixed-use building announced, this thesis initiates the conceptualization of the typology. By examining different examples, the concept of nowadays mixed-use building is portrayed in its entire configuration. This first analyze is based on the qualitative approach of the typology via a literature review and the desire to stick at the scope of this thesis. In this part, the identity of mixed-use building is clarified, and its most significant composition are analyzed.

Following this first analyze, a case study research is conducted. In order to confirm the outcome of the previous analyze, six buildings' architectural configurations are being studied. Selected by an elimination technic, the choices of the building were made on two different architecture competitions. This choice is justified by the fact that architecture competitions are a reliable source due to their selection criteria and professionalism. Also, the two competitions retained are among the most relevant worldwide. The selection by elimination is primarily based on the competition edition (from 2018 to previous edition) along with the category (mixed-use building), ranking in the category (first price to shortlist), then the country of origin (developed, developing, underdeveloped). Two countries were retained by country classification to vary the possibilities. At the end of the case study, result has been inscribed in a summary table to facilitate the comparison and allow one to one evaluation. After the different analyzes, the results are interpreted for to simulate expected effects on the case of Ivory Coast. This interpretation part aim to confirm the hypothesis of the thesis and open a range of solution for underdeveloped countries.

## **2. MIXED-USE BUILDING CONCEPT**

The general knowledge of mixed-use concept refers to a type of urban development blending residential, commercial, cultural and even institutional building purposes. As defined by the Municipal Research and Services Center (MRSC) of Washington, mixed-use development (MUD) is a typology that blends two or more building typologies and oriented by walkability. Mixed use is part of the ten principles of smart growth, which is a planning strategy encouraging community design and development that serves the economy, community, public health, and the environment [6]. But many analyses state that any built environment within a designated district whether planned or unplanned can be considered as a mixed-use development, because residence will gravitate towards daily activities and vice versa.

The current study defines MUD as the centralization of everyday activities in an innovative and dynamic lifestyle, orientated by the desire to incorporate those activities in order to create a sustainable settlement.

By mixing the different uses into one project, MUD takes advantage of the land upon which they are built. Attracting diverse users during more hours than a single-use building would be able to do. This study stands to make MUD take the form of a “single building” as a “building typology”.

This part of the study will give detailed information about the mixed-use building, from the chronological evolution of the concepts to the different points of views passing by the dimension it stands for.

### **2.1. HISTORY AND EVOLUTION OF MIXED-USE BUILDINGS**

Across ages, one of the most omnipresent habits of the human civilization was to mix land usages. Historically, the spaces required to house the essential functions of the built environment, including places to reside, socialize, produce and distribute goods and services, were tightly intermingled. In fact, walkability was the primary means of transportation, the daily distances that people were generally able to travel by feet was

fixing the activities between sleeping and working. This limited both the overall size of the settlement and the distance between the necessary functions.

From this medieval period through renaissance period (14th to 17th century), mixed-use idea has almost disappeared for three centuries. However, industrialization (18th to 19th century) at his peak brought a fundamental shift in development patterns that realigned the structure of the built environment, especially in the United States where were eroded the set of common principles that structured urban form [7].

### **2.1.1. The Medieval Period (5th – 15th century)**

Traditionally, the early human settlements were developed in different mixed-use patterns. Many visited sources as confirm that the medieval village of the 5th-15th centuries is one of the very first human living configurations that incorporating all the rules of MUD.

A medieval village was typically located on a hill while it was protected by walls. The smaller the circumference of the walls, the denser the village is. The need was to keep all the property uses close to each other, in order to beneficiate of the wall protection. This strategy would not have been possible if the village were spread out over many hundred acres [8]. Only when the walls couldn't contain more growth from the prediction of the population evolution, new ramparts were constructed. Main rules for building a Medieval Village was compactness; density; mixed uses and limited transportation systems. The following figure shows the illustration of a medieval village, we can notice the old walls of the village and the new ones bigger and lager all around the sprouted village. The organic village enlarging itself with logical road but same scheme.



Figure 2.1. Illustration of the medieval village of Milan 15th century [9]

Throughout human history, most settlements were mixed-use characterized. People lived near their work. Walking was the primary way to move goods and even travel, sometimes assisted by animals such as horses or cattle. People generally lived in buildings that were places for both work and domestic life. Increase in population and civilization led to the creation of markets and market towns. Buildings were not based on a room separation plan and most neighborhoods were diversifying uses. Some districts could develop certain predominance for socio-economic activities, such as metal workers, textiles or footwear due to the natural endowments of the zone. People's life and activities were scaled at the human body and his average capacity. Then life was settling in proximity and high densities because activities and the daily movement were determined by walkability [4]. For most peasants in the middle ages, life was centered on the village and around. The village was usually part of a manor run by a lord or someone of noble birth or a church or an abbey. Many peasants never went out of the village during all their life, because not

everybody was farming. There were many other crafts, such as blacksmiths, tapers, ale makers (usually women), potters etc and all-around handy men. The residents of the village owed fees and services to the lord, but it was not as significant as the farming land owner. Peasants and lords lived in a symbiotic relationship; each providing something needs to the other. Peasants was giving goods, money and some services and the lord offered protection and justice as it was expensive but important for the balance of the life around the manor [10].

As medieval villages sprouted from village cize to cities, they adapted many principles of that common habit to what will design the mixed-use community. In fact, the increase of population lead to the rise of towns and cities, several modifications were made between domestic and occupational life following the same scheme of the medieval village. For example, Athens was a medieval village of almost 4.000 inhabitants in the 1700's until reaching the town size of 10 to 12.000 inhabitants and being chosen as capital of the free Greek state in 1834. The "Sterea Ellada" was the name of the district of southern mainland of Greece throughout the period of Turkish rule, and Athens remained its largest city while presenting an impressive geographic expanse, beyond its medieval boundaries [11]. On the following Athens map in 1800 we can notice the walls (in dark); the old wall of the tiny village and then the others around a larger circumference enclosing the city to be. Also, at the different edges of the city we can notice the new social hub as the theaters and the temples.

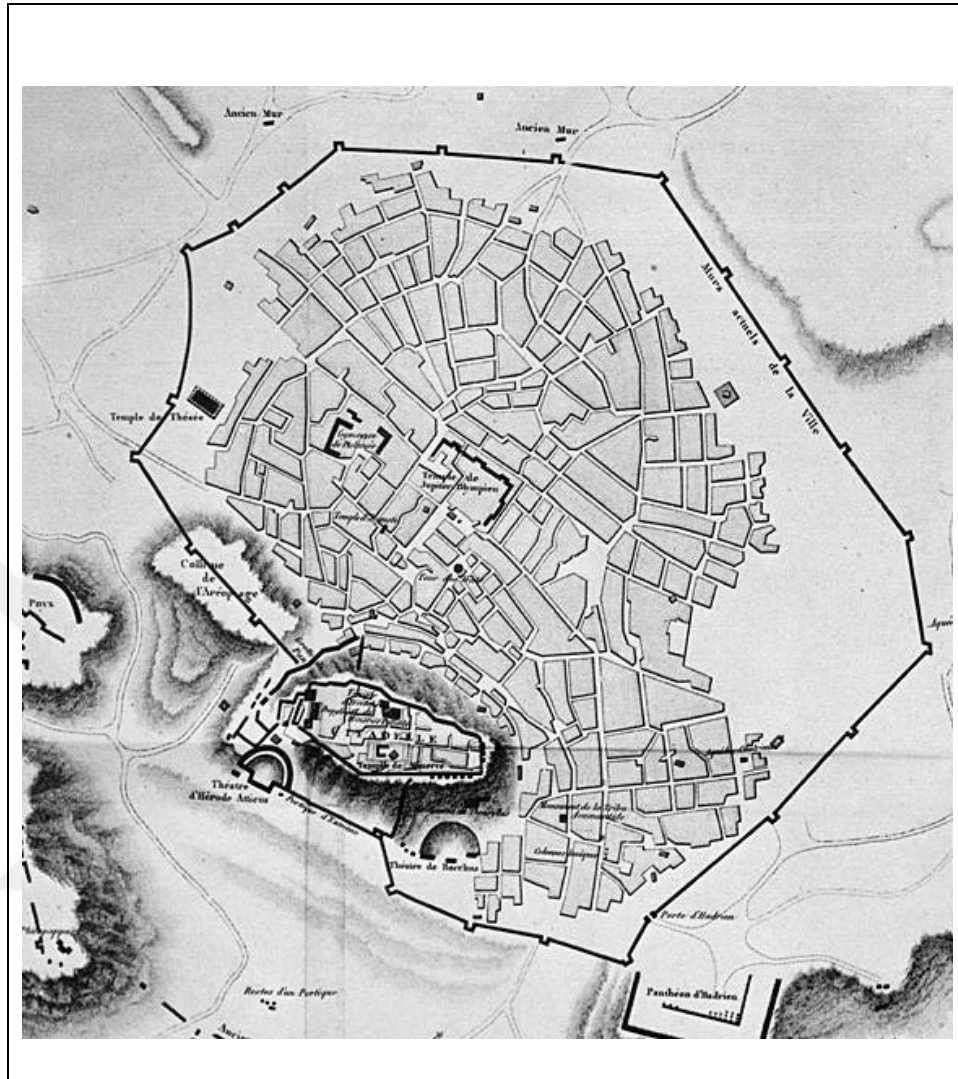


Figure 2.2. Athens map (1800) [12]

In fact, many societies were structured on this model for centuries, up until the early 1900s when development patterns changed completely with the advent of the trolley and the automobile and the requirements of new cities. But before to reach this period, they were a cession time where the concept of mixed-use and his layout where not part of the general understanding as a rule. The time of great achievement and conquest when the world interest turn to Europe and is rising art expression.



### **2.1.2. The Renaissance Period (14th – 17th Century)**

The Renaissance is the period in European civilization depicted by the ascension of learns and values of classical interest. Following the middle Ages, the Renaissance also witnessed the discovery and exploration of new continents. The Copernican system was changed by the Ptolemaic system of astronomy, the growth of commerce, and the invention or application of such potentially powerful innovations as paper, printing, the mariner's compass, and gun powder [13].

Few historians are comfortable with the triumphalist and western Europe-centered image of the Renaissance as the irresistible march of modernity and progress. The major implementation of the Renaissance was: a complete break with medieval values and institutions, a recovery of the cultural heritage of ancient Greece and Rome, a new awareness of the world by the nature and human understanding. Today, every particular of this formula is under suspicion if not altogether repudiated [14].

The Renaissance was a great period of discovering and conquest, the perfect time where the world face starts to change; it's the roots of the modern age. The intellectual basis of the Renaissance was the humanism. It can be described in those word of Protagoras "Man is the measure of all thing". The American Humanist Association defines the Humanism as a progressive philosophy of life that excludes the existence of a higher exitence. This theory affirms the ability and responsibility of human gender and its aspiration to the greater good.

Others definition on a different range painted humanism as the human nature in all of its various manifestations and achievements as subject. It stressed the unity and compatibility of the truth found in all philosophical and theological schools and systems; a doctrine known as syncretism. This definition emphasized the dignity of man with the trust that there is no absolute truth, but that which individuals deem to be the truth. Humanism is a method of learning that contrasts the medieval scholastic mode. Humanists were focusing on finding inconsistency between differnts theories; they were studying and questioning ancient texts with a combination of reasoning and empirical evidence. This new thinking became manifest in art, politics, science and literature [15].

Architecture has always been a part of art, but at this period architecture became “art itself”. Realism in art has been trend by the development of perspective; both architecture and art faced an imperial turned over.

Filippo Brunelleschi was foremost in studying the remains of ancient classical buildings, he formulated the Renaissance style that emulated and improved on classical forms. His major engineering work was building the Florence Cathedral's dome. Florence is one of the earliest models of the todays known urban planning. Based on a star-shaped layout, this new model was reflecting the enormous cultural impact of Florence in this age and imitated in many other cyties plannig through Europe. The Renaissance era was hypnotized by this city type and the immitation last for a century and a half [16].

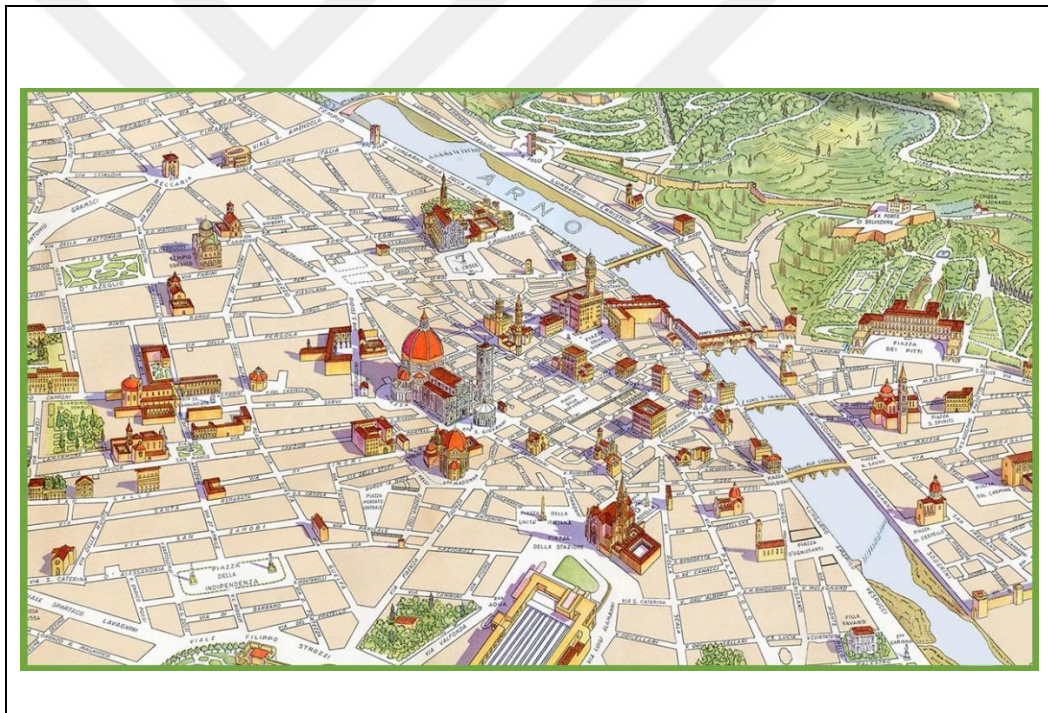


Figure 2.3. Florence city map (showing masterpieces and alleys plan system) [17]

Renaissance style is characterized by orderly arrangements of columns, pilasters and lintels, as well as the use of semicircular arches, hemispherical domes, niches and aedicule replaced the more complex proportional systems and irregular profiles of medieval buildings. As it is shown on the following illustration of Florence, radial streets extend outward from a defined center of military, communal or spiritual power. The places are emphases on symmetry, proportion, geometry and the regularity of parts. Acient Roman

and classical architecture are the first depositary of the renaissance style. From Italy to the whole Europe until Russia, the world has been affected by this huge wave of changes brought by the Renaissance. Jacob Burckhardt, in his book *The Civilization of the Renaissance in Italy*, assimilate the change brought by the Renaissance to a veil being removed from man's eyes, allowing him to see clearly. For him Renaissance is the primery human conscience awaking. Some Marxist historians prefer to describe the Renaissance in material terms. For them, all the changes are motorized by the economic systeme evolution from feudalism towards capitalism. This new economic pattern results from the growth of the bourgeoisie which devote its time to art and litterature.

Above all, they sought to establish the ideal proportions for a building, based on those of the idealized human body. The advent of printing brought architecture and urban planing closer thanks the sharing of precise information it allows. The Renaissance conciliate a lot of practice as architecture and sculpture as well as mural painting in an overall process. (Encyclopedia of Art and Design) At the peak of this period (end of 16th – 17th) rulers often embarked on ambitious attempts at redesigning their capital cities as a showpiece for the grandeur of the nation. Also, disasters and war were often a major catalyst for planned reconstruction. Brussels after the bombardment by French troops, Carolina province (U.S.A.) after the great fire; and many others cities where rebuilt or improved with the features of the “Renaissance type”: logical street layout, straight avenues offering long and uninterrupted views, buildings of a uniform size, large alleys [18]. At this period the Church was the most powerfull "organisation" and its affiliated nations were emerging. These new nations had Roman Architecture as symbol as Roman Empire was their model. The round arch, the vault, and manly the dome, were charaterising the architectural forms after the powerful example of the Pantheon. At this point, a split occurred between the processes of design and construction. The first architects (a word derived from the Greek *architekton*, meaning a chief craftsman) were appearing. Building design and construction were separeted in two different professions. The architect was the one conceiving the building form and the builder was the one excecuting the construction. The first building in which the designer and the builder were separate persons was the Campanile (bell tower) of the cathedral of Florence. The design was made by the painter Giotto and constructed by cathedral masons from 1334 to 1359 [19].

Almost no mixed-use building construction was recorded at this period. European builders used the classical world's technologies with different materials suitable for churches, palaces, and fortifications. Brick, stone blocks and timber on stable plateau was used. The Mixed-use development started to quit communities' lifestyle, neighborhood notion is introduced and architectural masterpiece was the new trend. The mixed-use conception that was a logic evolution at the medieval time was no more the topicality; the actuality was enhancement of the past, a retrospection. Then from an extension guided by population growth and defensive strategy at the medieval time the general architecture shifted to urban planning with aesthetics and grandeur as main aim. New frame and new expectation were announcing the next age; urbanization hosted by industrialization were coming to light. France with the transformation of the Medieval street plan by demolishing swathes of the old quarters and laying out wide boulevards, extending outwards beyond the old city limits (today call Boulevard Haussmann) [18]. Regulations of the building façades, public services and public open space with monuments or water works were established. Barcelona with its extension plan based on a scientific analysis of the city and its modern requirements, plus the filling of the space created by the city old walls demolition in 1854 was engaged. The Catalan engineer Ildefons Cerdà invented the term 'urbanization' on this project and his approach was codified in his General Theory of Urbanization in 1867 [20].

Beyond aesthetic and sanitary considerations to improve inhabitant's health, the wide thoroughfares facilitated troop movement, policing and tram movement. Russia, Great Britain and the USA, can be also be cited for starting and keeping their cities organized and enlarged on the same model. This state of affair will get to another stage with the world new process that will follow the renaissance by the end of the 17th. The coming era of Industrial Revolution, however, brought new materials and technologies which transformed the building environment.

### **2.1.3. Industrialization and Urbanization Period (18th - 19th century)**

The Industrial Revolution designates the transition period from manufacturing techniques to the industrialization process from about 1760 to 1840. This process is characterised by the change of hand production methods to machines. New chemical manufacturing, iron production processes, the increasing use of steam power. It is a period during which predominantly agrarian, rural societies in Europe and America became industrial and

urban. Prior to the Industrial Revolution, which began in Britain in the late 1700s, manufacturing was often done in people's homes, using hand tools or basic machines. Industrialization marked a shift to powered, special-purpose machinery, factories and mass production. The iron and textile industries, along with the development of the steam engine, played central roles in the Industrial Revolution, which also saw improved systems of transportation, communication and banking [21]. Technological advances dramatically increased the productivity of individual farm laborers, and mechanization, along with the division of labor, created industrial synergies in the mass production of goods. This had three significant implications for the built environment: first, small artisan shops were replaced with large factories that were able to take advantage of economies and scale; second, live/work dwellings were supplanted by tenements which were required to house the deluge of workers that poured into cities from rural areas; third, the rise of industrial capitalism and growth of corporate bureaucracies created the need for large amounts of clustered office space.

In addition to people having access to more efficient modes of transportation, the population in the US was also exploding at this time and as American cities swelled to dangerous levels, local governments began to mandate segregation of land uses, for the health and welfare of its citizens. At the time, this seemed like a brilliant idea. If city planners could divide their cities up and create different "zones" for different uses or functions, they could then nicely organize the cities of the future for maximum functionality and safety for its citizens. Retail, work, living, schools, etc. were all segregated from each other [7]. Zoning was initiated as a development control by the U.S. government in New York City, in 1916.

However, as time went, city planners began to see a plethora of unanticipated side effects from the new urban sprawl. Zoning had favored the increase of daily traveling distance, augmentation of the energy consumption, inflation of public services costs etc. Many central cities decline while social and environmental layers were critically affected.

Then from about the 1910s through the 1950s the idea of integrated land uses was rare in new developments. Mixed-use idea almost disappears with the needed of the industrialization [8]. Part of the problem may be the underlying legal framework for land use. Despite far-reaching plans, most USA cities regulate land use with Euclidean zoning,

those colorful polygons dividing the city map into various districts which proscribe use, bulk and density. Although considered anachronistic by a substantial proportion of the planning profession, Euclidean zoning persists [22]. Euclidean Zoning is a system based on zones separation in a town or community. The system divides in specific areas the land and assignate an activity to each of them. This name comes from the village of Euclid in the state of Ohio. In 1926 the U.S. Supreme Court upheld the right of a locality to enforce such a system

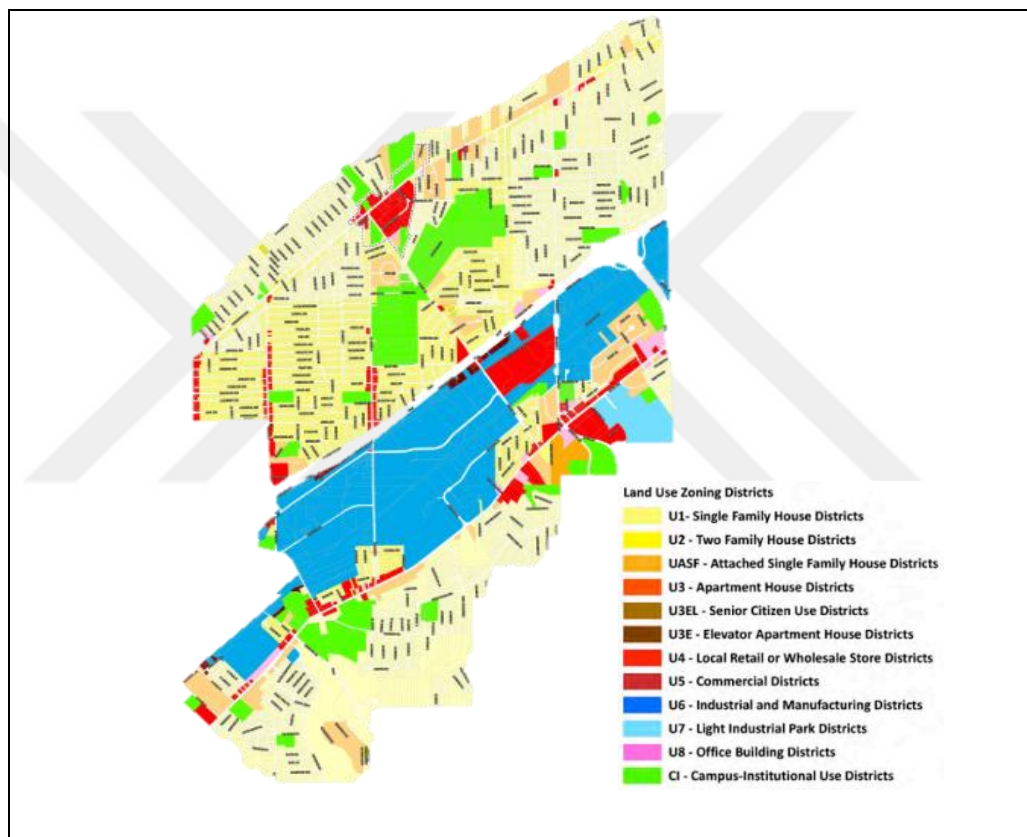


Figure 2.4. City of Euclid (United States) [23]

The basic problem is that Euclidean zoning creates zones, not neighborhoods. In fact, the critics about zoning stand for restrictions as a violation of property infringement and also have as a way to promote social and economic segregation. Euclidian zoning was at this point perceived as a controversial increasing complexity of social, political and environmental challenges in cities [24]. With farm laborers increasingly being replaced by technological advances in agricultural machinery, workers from rural areas began migrating en masse to cities with the hopes of finding employment in the factories.

Urbanization refers to this population shift. This process enlarges cities according to the flow of people that come to the center looking for better work opportunities. As all the significant revolution, Industrialization affected architecture. The architectural trend went to what will be called Modern Architecture at the pick of the 19th century. This architecture is based on new technologies with a special use of glass, steel and reinforced concrete. Innovative construction principles as form should follow function and stylized form without ornament emerged [25]. People started design more “industrial type”, with rectangular or cubist shapes, no ornamentation, large windows and open plan. The Crystal Palace is one of the greatest buildings of Industrial period, which represent new direction in architecture. The industrial revolution architecture moved upscale with this innovative sturcture. Cited as an example, the structure marked the beginning of a different type of architectural expression with new materials and maximization of the inner space. Lightweight, low-cost material, glass and cast iron the structure was built to house the “Great Exhibition of the works of industry of all Nations” in 1851 in London.

The biggest concern with the building was to maintain a normal temperature inside as the glass would have exposed the indoor to sun heat. Also, as it was built for an exhibition, the Crystal Palace was expecting thousands of visitors, and a system must have been found to deal with the additional heat generated by people. Joseph Paxton cleverly designed the external shading devices which filtered sunbeam and avoid direct exposure. He adds further soltution with a ventilation system throught walls and flooring [26].

With the time, controvery effects of zoning and its system start to embarassed city planners. The urban sprawl was creating more problems than the solutions it was bringing years ago on the socio-economic layers. Even the environment was damaged by high energy consumption and pollution (industires and vehicules) [27]. Urbanization syatem was rapidly spread across the western world since the 1950s, it consequently touches the developing world as well. At the begining of the 20th century, statistic advocates 15 percent of the world population living in cities. According to the UN, the year 2007 witnessed the turning point when more than 50 percent of the world population were living in cities, for the first time in human history [28].

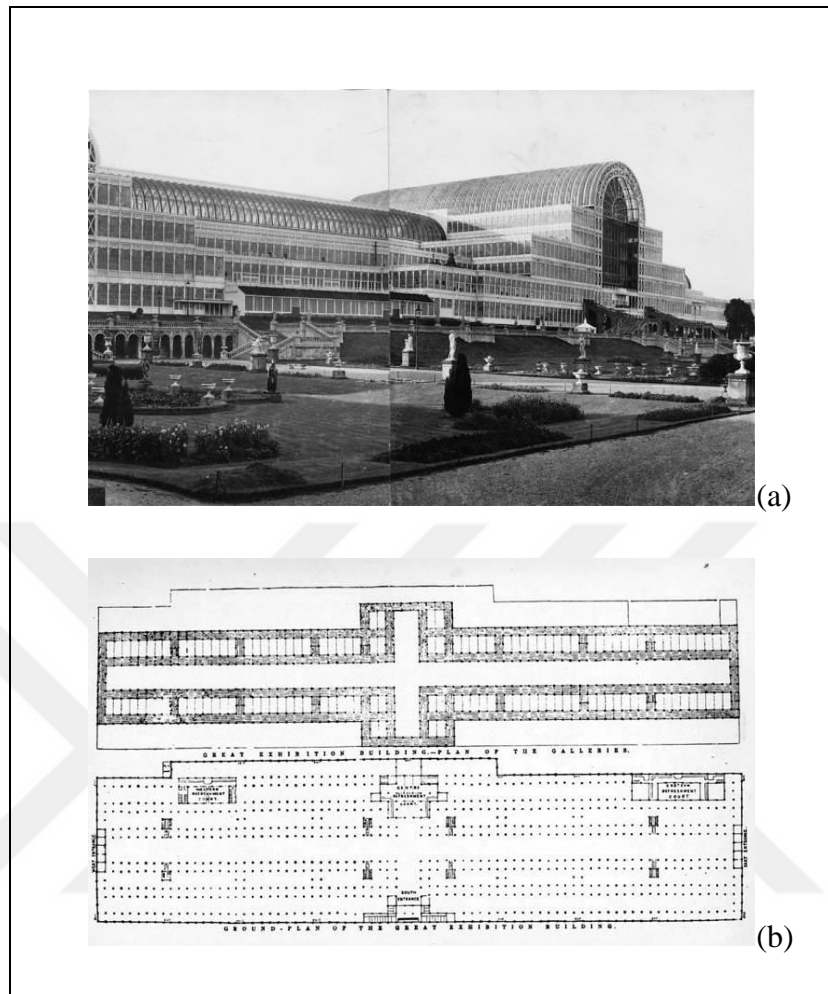


Figure 2.5. Crystal Palace (a) View (b) Plan [29]

City center, classification, zone, suburbs, discovering, diversification of activities and light architecture was the lexical champ of the industrial revolution. The industrial revolution marks the session with the past and the beginning of the modern world as we know it today; and all the concepts it brings were in “contradiction” with the idea of mixed-use development. Mixed-used pattern of development have been dismissed in favor of large-scale separation zones. The system was separating industrial activities from residential and commercial zone.

But in 1961 Jane Jacobs in her book *The Death and Life of Great American Cities* critiqued the modernist city planning and policies of the time. The book argues that the system was destroying the inner-city communities through the separation of uses. It advocated for a new challenge that might create social recovery and interaction to enhance



economic growth. These challenges are mixed uses, short blocks, density and buildings in various states of repair and age. Jacobs' work was widely read by planners, architects, other professionals and even the general public saw the benefits of this theory.

Following those events Mixed-use re-emerged primarily as an urban revitalization instrument, often as part of large-scale development. The typology was more integrated into urban contexts, often for historic structures refurbishment. As the trend were changing gradually to "community life" and density, the worldwide was about to face the biggest interaction and integration between humankind and his activities.

#### **2.1.4. After Globalization (20th - 21st century)**

Globalization is the world biggest economic movement that consist in the interaction and integration among the people, companies, governments of different nations, a process driven by international trade, investment and aided by information technology [30]. This process has effects on all the dimensions of human life and activities worldwide. In the years since the Second World War, and especially during the past two decades, many governments have adopted free-market economic systems, vastly increasing their own productive potential and creating myriad new opportunities for international trade and investment. In 2000, the International Monetary Fund (IMF) identified four basic aspects of globalization: trade, investment movements, population movement and access to knowledge. Globalization processes affect socio-cultural layers, business and economics resources, even natural and environmental resources. In fact, globalization is a flux of free access that allows anybody by reaching an information to be able to drive it on his own. Going almost everywhere, realize, create and even learn anything from anywhere.

Academic literature commonly subdivides globalization into three major areas: economy, culture, and politic.

In architecture, the historical development of globalization corresponded very closely to the ascendancy of Modernism. It can be noted that Modernist ambition is a global movement based on the ideals of the emerging north Atlantic countries and stand for rationality, and progress at the expense of tradition [31]. In 1919 Walter Gropius said: "One day there will be a worldview, and then there will also be its sign, its crystal architecture."

Around the late 1970s and 1980s mixed-use developments began to reemerge with this wave. However, the projects were small scale in contrast to the previous wave and often incorporated into urban development. Three or more uses were meaning large scale, but new development made possible small-scale mixed-use project [27].

From this time, emerge the concept of today's mixed-use development. MUD's are designed following those attributes: be a development project that should be in conformance with a coherent plan, have components significant enough (for example, more than site serving convenience facilities.) and be pedestrian friendly. Furthermore, the two poles of globalization are homogenization and localization; the architectural profession at the earth of this movement has been equally clear. Postmodernism and the particularity of place are the clear reflections of those two poles.

Postmodernism is as MUD a melting-pot based style. It emerged at the end of the 20th century and is in contradiction with the precept of modernism. It's against austerity, formality and advocates the sense of history and place it appear at. Postmodernism style emphasis the facade, incorporate historical elements, a subtle use of unusual materials, featured historical element, and the use of fragmentation or modulations to make the building interesting. Robert Ventury said, he prefers hybrid elements rather than "pure" ones. He was a partisan of compromise, accommodation rather than exclusion and fixation. As a postmodernist architect, architecture is for him an interpretation system of complexity and contradiction rather than simplistic concept as uniqueness and exclusivity [32]. Architecture has never been and it will never be in the margins of the socio-political conditions. It is as opposite, the mirror of the society it belongs to and at the same times the real image of the desire to resist against the abusive impacts of the same system it is part of.

One of the early examples and emblematic figure of mixed-use building is the Cleveland Union Terminal (now called Tower City Center). Designed by the firm of Graham, Anderson, Probst, and White (GAP&W), the complex opened in 1930. The project was featuring a train station, diverse shops and restaurants, Higbee's department store, a medical arts school, an 18 story builders exchange building, 52 story terminal tower, the Hotel Cleveland, the post office and a large public open space.

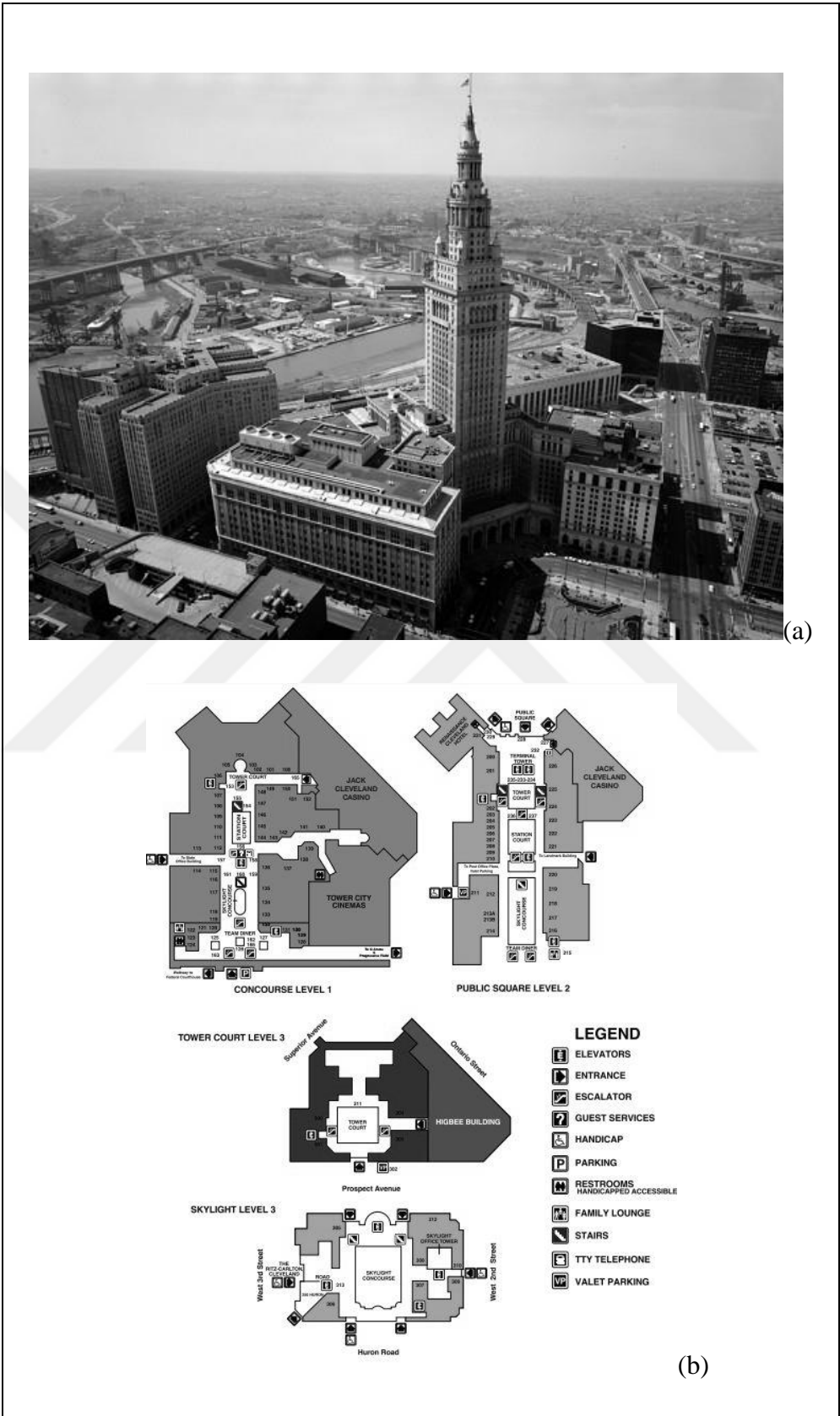


Figure 2.6. Cleveland Union Terminal (City Tower) (a) View (b) Plan [33]

Global architecture has many landmarks in the gender of corporate office, the airport, the international hotel and the shopping mall. Mixed-use building then became the perfect symbol of this new view. It carries by its design and investment strategies both the sense of place and modernism. According to Dr. Mervat, architecture is the definition and the practices of the cultural identity.

Another example of early MUD is Baltimore's Inner Harbor that has transformed Baltimore City from a small flourishing industrial town into a booming touristic destination. In fact, at the 1790s, Maryland states led the USA in shipbuilding, and Baltimore was the undisputed leader of this industry on the Chesapeake Bay. A part of shipbuilding, oyster canning (1840's) and steel industry (1890's) was established in Baltimore. With the oyster beds nearby and the workers from rural Maryland and all the region around attracted to the promise of high-paying industrial employment. The city's growing population of workers plus the rail connections and expansion made Baltimore a leader of those various industries. With these population shifts to the suburbs and business activity that followed, economic conditions in Baltimore declined. After many years leading the industrialization in the area, Baltimore was forced to stop its activities and think otherwise. Revitalization was the only way [34]. Investors along with the government wish to save the harbor start a planification. But this plan was quickly expanded to the all place around the harbor. In 1980, Harbor square and the National Aquarium opened, securing Baltimore's place as a center of tourism activity and a model for waterfront redevelopment around the world [35]. The American Institute of Architects in 1984 on a publication mentioned the Baltimore Harbor as "one of most achieved large-scale urban development in U.S. history."



Figure 2.7. Baltimore Inner Bay (a) in 1900 [36] (b - c - d) in 2016 [37]

The completed projects include mixed-use developments incorporating office and retail with a condominium project. Nowadays, Baltimore's tourism industry still prospers, and has become one of the city's top employment sectors. World-class attractions as floating museums (historic ship), luxury hotels (Ritz Carlton Residence, Renaissance Hotel), Museum (Reginald F. Lewis Museum of African American History and Culture, American Visionary Art Museum), Concert hall and arenas (Baltimore Convention Center; Royal

Farms Arena) and other attractions. The harbor is today a destination of choice for entertainment and business.

Here used as a revitalization of the urban and economic activities of the Baltimore city, MUD's can nowadays host many other dimensions. In his article Code of Contest, Jay Wickerham present signs of globalization in architecture by few facts. All around the world we can see buildings designed and construct by foreign architects and firm, people were before travelling to see what a certain architecture look like in the area it is most dominant but globalization permit architecture from any style to be developed everywhere; "Architecture is travelling" to people. Architecture firms can take steps to ensure that their designs act in the best interests of the foreign communities they affect from the Middle East to Africa or to Asia [38]. In the winter 2014 article of Global (a periodical housed by the American Institute of Architecture) many questions have been underlined about the real role of architects in the globalization process. Are architects creating a vital and original new architecture, or are they homogenizing cities and landscapes and obliterating regional differences? Are architects helping to strengthen and develop the economies of host communities, or are they acting as unwitting tools of inequality and repression?

Many questions that need to be enlighten for a better understanding of the different trending type and architectural development. In the following part of this study some answers will be given to clarify the real around of mixed-used development as a pure symbol of globalization. As mention on the report of the Institute for Public Administration (IPA) at the University of Delaware, mixed-use is a Smart Growth process which provides strategy to foster community design and development to serves economy and socio-environmental life.

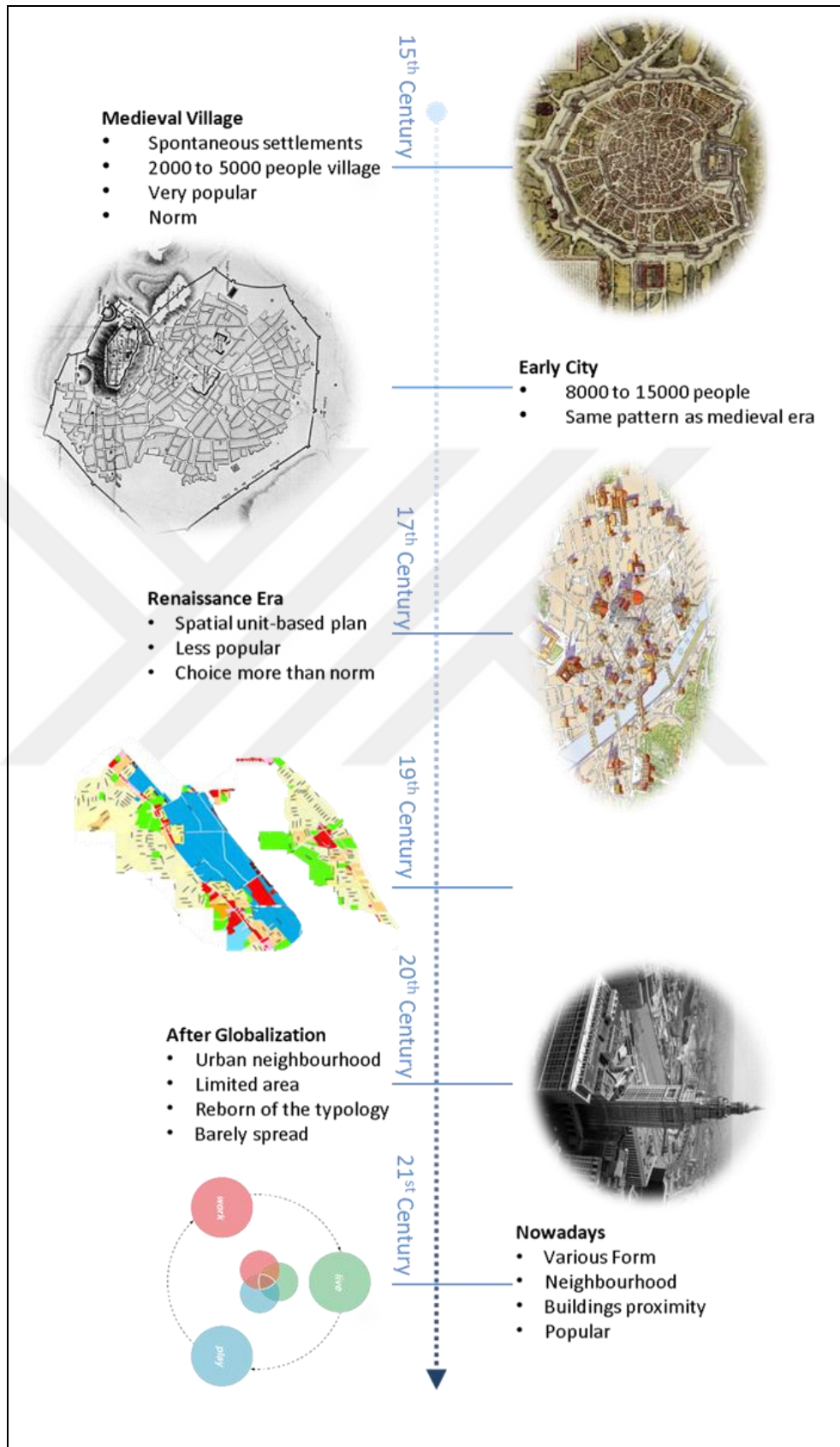


Figure 2.8. Mixed-use timeline

## 2.2. MIXED-USE DEVELOPMENTS IN 21ST CENTURY

Since the 1990s, mixed-use has once again become desirable over zoning as the benefits are recognized. The excess usage of automobiles today has resulted in higher pollution rates, health problems and time wastage. People are going back to accept mixed-use land development projects due to the degradation of environmental, social, and economic factors.

According to the following design scheme, mixed use land development can be categorized broadly into two categories. First is the site mix method where different functions are distributed horizontally on site and the second is the building mix method, where different functions are stacked vertically in one building [37].

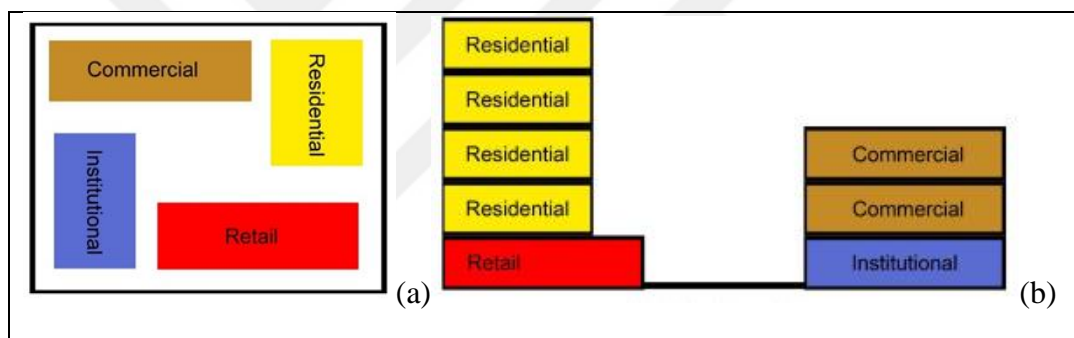


Figure 2.9. Mixed-use development illustration scheme (a) Site mix (b) Building mix

MUD is often used as the immediate response to revitalize vibrancy in precincts, to relieve transportation problems and to address densification issues. Typically, a project is defined as mixed-use if it has more than one use council in the same project. Mixed-use developments have different types as well; they can be separate in three groups that are horizontal, vertical, or proximate (combination of horizontal and vertical). Horizontal developments are essentially vertical developments laid on their sides. Vertical mixed-use developments are multi-story structures. Proximate developments utilize multiple buildings to form a complex with different uses throughout the structures in the complex and are in a defined area [40].

Horizontal mixed-use developments aim to provide proper separation between buildings with different uses; it requires large or wide sites. This approach avoids the financing and



coding complexities of vertical layered uses. Moreover, the goal of creating diversity and density is the same, but horizontal mixed-use development favors activation of street edges by locating commercial and retail activities at the front of the site. It can also permit to create soft separation for incompatible uses through separation distances. In some cases it makes an easy connection between social and professional activities and can even facilitate access to local employment opportunities [41].

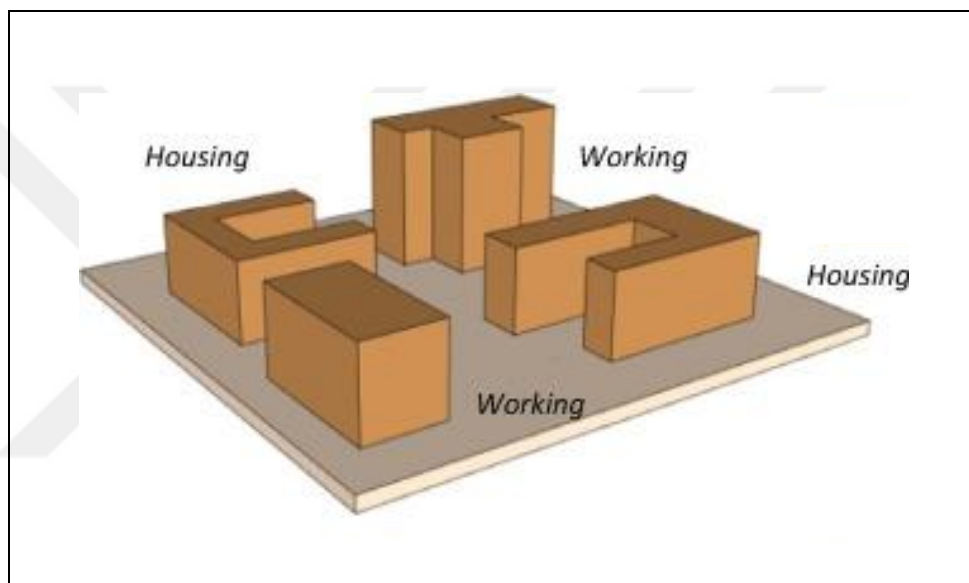


Figure 2.10. Horizontal mixed-use development illustration [41]

Vertical mixed-use development combines different uses in the same project with a relatively limited footprint and the service he provides one upon the others. Vertical mixed-use developments are more suitable for town centers and major transport corridors, where there is a demand for street-front retail and commercial activities. Lower floors have more public uses while more private uses are located on the upper floors. For example, the ground floor could have retail, above them professional and offices, and uppermost floors being some form of residential, such as flats or a hotel that can benefit from improved privacy, access to sunlight and views. Vertical mixed-use also activates street edge through ground floor retail and commercial uses; whilst providing passive surveillance of the upper private spaces [5].

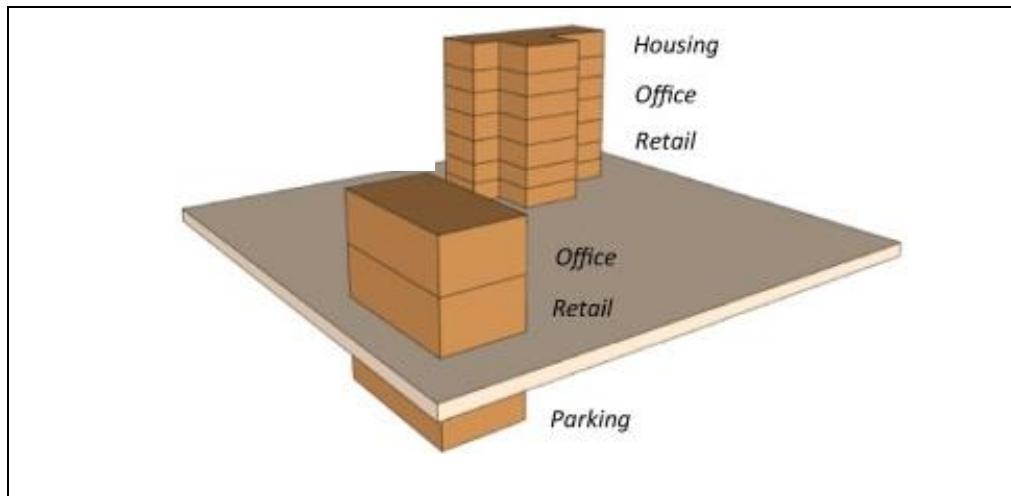


Figure 2.11. Vertical mixed-use development illustration [41]

Proximate mixed-use development combines transit-proximate development that takes full advantage of or fully encourages the nonuse of the public transport node it has some nearby. This configuration generally combines both vertical and horizontal type, mixed in an area ideally within a 5 to 10 minute of walking distance. It can include buildings with extensive parking facilities typical of suburban locations or extensive pedestrian facilities that would make easier the connection between the buildings and the activities it provides. Despite the density of an urban area, proximate mixed-use development can help to integrate high density developments into otherwise lower density and vice-versa. This type of mixed-use development offers the advantage of sharing utilities and amenities while providing an entitle mix of uses within a walkable block circumscribed by streets [43].

Proximate mixed-use development can also integrate courtyard design. It consists of outdoor spaces enclosed by two or more blocks of buildings. This configuration facillitate a multiple number of uses by adjoining the street form or an extension of the public realm. Also suitable for commercial tenants seeking a high foot transition it favored visual or acoustic buffering between incompatible activities and increased air circulation. It can provide functional outdoor space for occupants (private or common) and access to natural light.

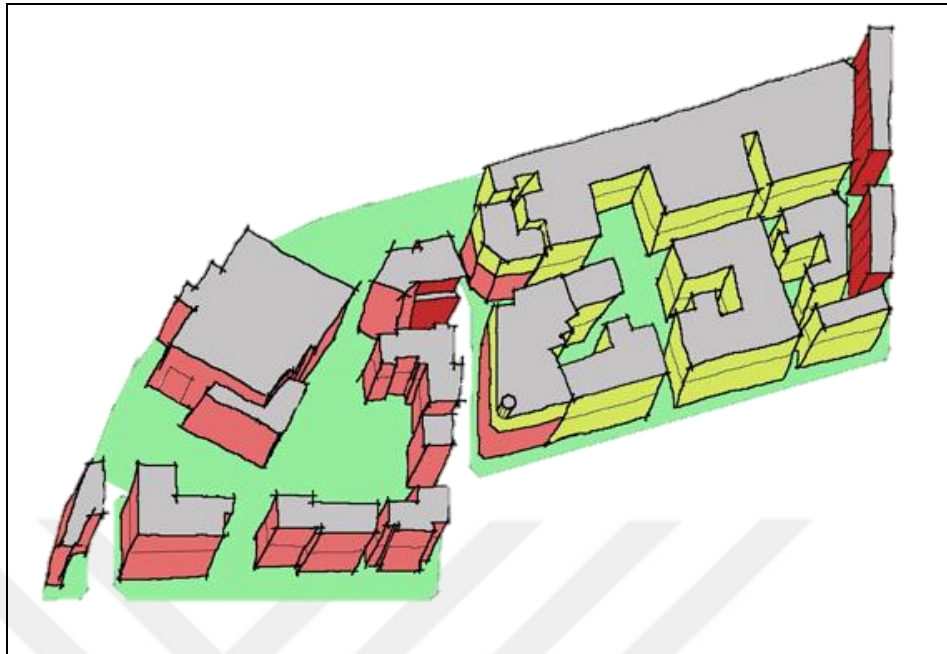


Figure 2.12. Proximate mixed-use development illustration [42]

Today, from the common people understanding, mixed-use is any shop front with housing above anywhere or in any context. It is a grave misunderstanding that make the idea of mixed-use difficult justify. Despite the mixing ratio of the different service that it is providing, a mixed-use development should stand for two other dimensions that are pedestrian orientation and public amenities. Mixed-use development primary characteristic is to harness and enhance the attractiveness of the place they belong to. Variety and vitality should be achieved equally by a mix within use or as a mix of different uses.

Also they should offer potentiality of lowering private car dependence by promoting a multi-modal travel style (due to the proximity to facilities and encouraging innovative public transportation) [43]. Mixed-use developments began to emerge as manifestations of sustainable design, walkable urbanism and “smart growth” initiatives. They became integral components of “Transit Oriented Development”, “Traditional Neighborhood Developments”, and were considered an essential ingredient to the creation of “Livable Communities” [44]. Mixed-use developments are characterized by their ‘live-work-play’ facilities and amenities in a single development. Individuals and families can choose housing options for short and long term accommodation; commercial establishments are available for shopping or working and services and amenities are accessible for recreation and entertainment [46].

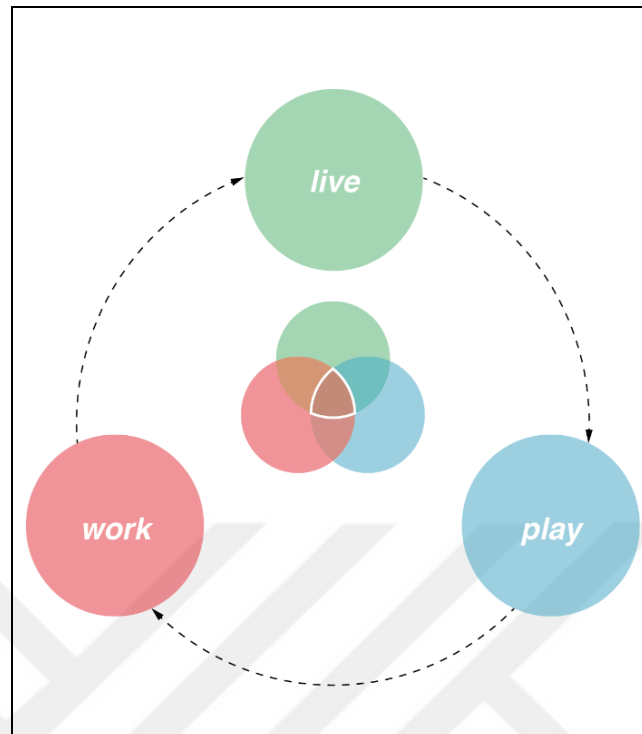


Figure 2.13. Life Work Play illustration schema [46]

Various current movements in urban design seek to create sustainable urban environments with long-lasting structures, buildings and a great livability for its inhabitants. Transit-oriented development (TOD), new urbanism and smart growth are some significant concept that aims a sustainable community model [4]. TOD is urban development that aims to increase public transport utilization to reduce the use of private cars and promote a sustainable urban growth. New urbanism is a movement which promotes environmentally friendly habits by creating walkable neighborhoods containing a wide range of housing and job types. Smart growth is an urban and transportation planning theory that gather people and they activities in a compact living area (mostly city centers) to avoid sprawl [47].

A sustainable community reflects the interdependence between economic, environmental, and social issues by acknowledging that regions, cities, towns and rural lands must continue without diminishing the land, water, air, natural and cultural resources that support them. These ideas can all be circled back to two concepts: building a sense of community and the development of ecological practices. Mixed-Use Development one more time shows all the specification of those movements and this study stand to

concentrate all those values of the sustainable model in a building. The following part of this study will try to detail all the values and critics related to mixed-use as a building type.

### **2.2.1. Values of Mixed-Use Buildings**

Mixed-use building development have many benefits, from their design complexity to their implication in the general blossoming of the area they belong to, through the inner purpose of the building itself. Mixed-use building installations stand for serious matter of compatibility (arrangement of uses, noise, relationship to the street and integration / streetscape character) for both internal and external arrangement according to the design and the urban context it is develop for. Location, access and connection are prior factors to a mixed-use development [43]. The Mixed-use practice and potential by the Department for Communities and Local Government of London explains that mixed use development type as an instrument in designer's repertoires, available to be used in specific circumstances in order to achieve particular urban design goals.

Mixed-use development benefits can be analyzed in three dimensions: social, economic and environmental. Those three dimensions represent the everyday life aspect that mixed-use building is powered to enhance. The social layer that refer to people interaction, the economic layer referring to the people activities and the environmental layer that concern the whole interaction with the city and the urban plan the project should fit in.

#### **2.2.1.1. Social Benefits**

Development and a sustainable evolution state that mix of use bring a lot of potentiality by ensuring vitality, density and interactivity both between people and activities. The following diagram illustrate why many government and urban planning rulers support mixed-use development. In fact, from the concentration of activities and their diversity, it can be created a synergy that might have a good repercussion on everyday actions to create a sustainable model.

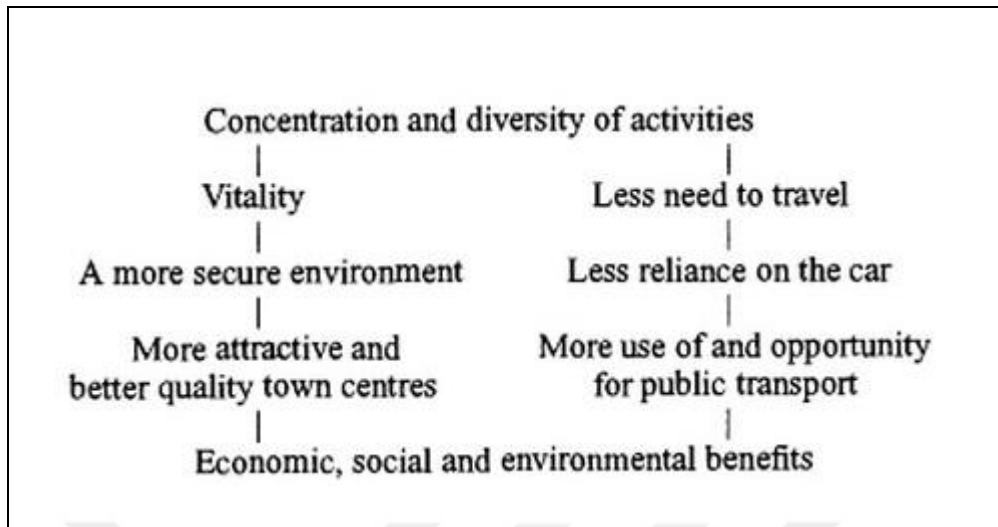


Figure 2.14. City center sustainability orientation diagram [48].

The various advantages of a mixed-use building in city center concern greater and more affordable housing in their variety and density; it reduced distances between housing, workplaces, retail businesses and other amenities; more the development is compact and well oriented, more the synergy is high (e.g. residents provide customers for retail which provide amenities for residents). Mixed-use building creates stronger neighborhood character, increase the sense of place and enhance safety through the long presence of people. Walkable, bike-able neighborhoods, increased accessibility via transit, both resulting in reduced transportation costs; this result to a less urban sprawls and activates urban areas during more hours of the day [39].

The World Resources Institute (WRI) by one of its branch focusing on sustainable urban mobility state that “Everyday needs should be close enough to residential neighborhoods that they can be reached by walking, bicycling, or public transport.” Embarq

This quote supports the previously cited benefits of mixed-use building; by simplifying and shortens movement of the everyday professional and personal activities people should have more time to either socialize or work and even for themselves. There is considerable evidence that mixed-use development in conjunction with other design conditions, such as connectivity can minimizes distances. As explain on the Embarq official internet page, an urban mobility expertise laid in collaboration with local or national authorities for businesses and civil society to reduce pollution, improve public health, and create safe,

accessible and attractive urban mobility can be a good solution and opening to a sustainable model.

A mixed-use building is practical and can be sustainable at both the individual and community level. It diminishes infrastructure investments in roadways, transit systems. Also, the operationalization and maintenance costs that accompany each public venue have a weight cost that can be removed on local and regional government's resources. In a broader sense, mixed-use building can also be a tool to shape a community cohesive and lasting layer. By bringing people in pedestrian environments together and allowing them to interact face-to-face, it creates an "in-between" space that link work and relaxation and emphasizes a public domain that is shared by all members of the community [49]. Sociologists and urban observers like Jane Jacobs and William H. White have heralded the social and cultural benefits of mixed-use environments for decades. Mixed-use building implementation can also favor safety feelings and security in the neighborhood. In fact, the organization behind mixed-use building administration always include security program and even in case the organization fail, the activities and numbers of people drain by days create a more ensuring space to cross than a single use space that have very limited activities time.

This allows people to make more trips by foot or bicycle than by car, with clear health and convenience benefits. Car ownership levels do not necessarily change (cars are still used for trips outside the neighborhood, or for heavy shopping trips - but people may not use their cars as often). Household spending on travel and transportation may be reduced and this can be a serious matter for families' social activities they can afford to themselves on a long term [50].

Social aspects and benefits of mixed-use building as cited and explain before are encouraging, and to as mentioned in the sustainable model to achieve, all the layers of the community life should be closely linked in order to evolve together. Then the directly link layer to social blossoming is the economic volley. The next step is then to enlighten the economic benefits of mixed-used building.

### ***2.2.1.2. Economic Benefits***

Basically, when people live, work and play in a small area, they are more inclined to spend their money in that same area. This basic empirical assumption leads the idea that mixed-use building generates economic cycle. Globally the economic benefits of mixed-use building are based on two categories of benefits: direct benefits (temporary) and indirect benefits (permanent). Direct benefits are linked on one hand to the short-term business activity from the project construction and on a second hand the ongoing business activity associated with the businesses that are located within the developed project. Also, the consumption and spending of employees of firms that are directly or indirectly affected by the project can be counted. Indirect benefits are the ones associated with the ongoing operation of the commercial activities that will result on local firms directly impacted by the project purchasing materials, supplies or services from other firms. These would include all the goods and services normally associated with household consumption. [51] In this way, mixed-use building in they well thought planning and by the quality of the installment will create higher rents that is a good thing for the owners and even the renter because this apriority ensures them a qualitative services behind. By the diversification, investors reduce their risk of loses and this situation support the development of a good business plus the promotion of local tourism [52]. This exchange between the community members strengthens the local and regional economy and helps bond community members together. Despite the directly concerned and the subscribers of mixed-use building the authorities also encourage mixed-use building construction because it also has a role in the increasing of tax revenue.

The impacts mainly related to the construction of the building, are obvious and relatively easy to quantify but the others impact related to the economic activity of residents and commercial tenants is difficult to predict because those predictions rely on future factors that cannot be foreseen. As it is mention in the report by CEO's foe Cities (Walking the walk) some research has shown that other variables are important in explaining the link between mixed use development and the economic benefits they can afford as home values, lot size, building improvements (fireplaces, swimming pools, garages), and the quality of local schools and even environmental amenities. Furthermore, According to the Delaware State Housing Authority, compact growth uses 20 to 45 percent less land than



overspill development. The statistic is consistent with the Delaware State Planning Office's principle of conserving open space, honoring historic resources, and reducing the impact of the car. Environmental benefits can then also be counted as the advantage of mixed-use building.

### ***2.2.1.3. Environmental and Health Benefits***

An American public health expert, Dr. Richard Jackson is promoting dense mixed-use environments with a high level of pedestrian activity as a means of health increasing clue. Mixed-use walkable pattern is a good agent for reducing or at least help fighting some dietetic disease, and heart problem. Environmental stability created in quality mixed-use environments are great contributors to that health. Previously cited benefits as car usage reductions are directly linked to environmental benefits by the fact that it's lowering volumes of air pollutants entering the atmosphere [49]. Fewer cars mean less traffic and also less noises. The incorporation of mixed-use building with sustainable models could be reduced sprawling development patterns and quality of life may be enhanced. Greenfield land, historic and natural resources could be preserved. A social character of mixed-use building with inner garden, courtyard and Public Square is also a good point to environmental profit. The Delaware State Housing Authority provides a research that shows over 50 percent of Americans would walk and bike more than driving if given the opportunity. Mixed-use environment represents a perfect opportunity. Also, all around the world new mixed-use buildings are being award of LEED (Leadership in Energy and Environmental Design) certifications for practices that reduce the environmental impact linked to their construction and their operation system.

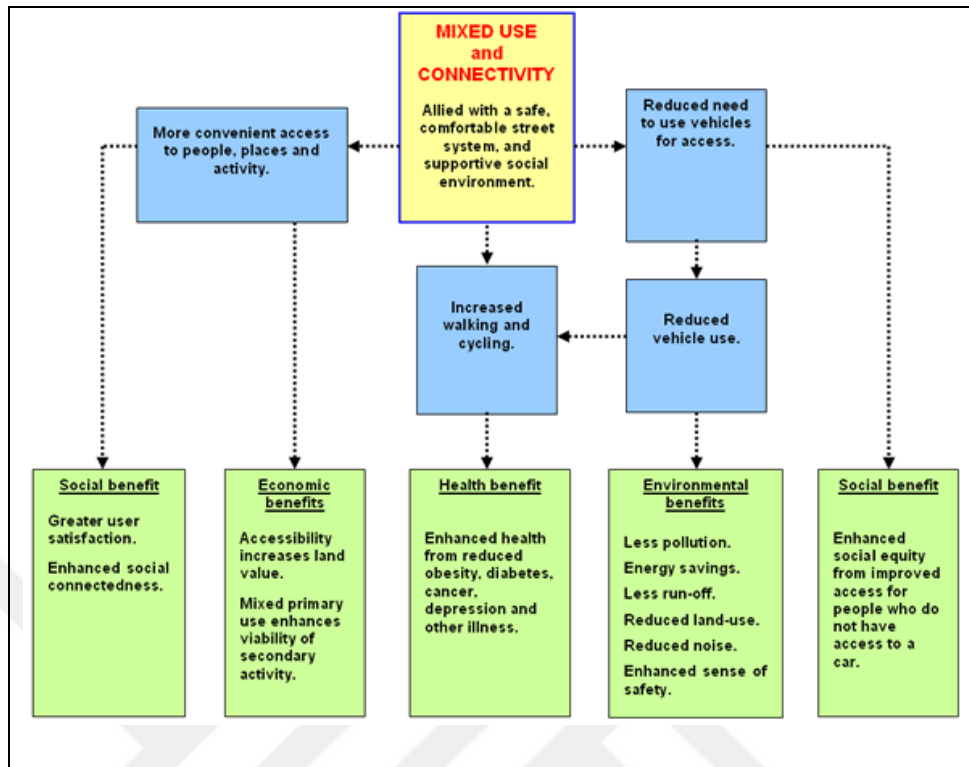


Figure 2.15. Figure benefits of mixed use and good connectivity [53]

The illustration summarizes the benefits of mixed-use building and good connectivity to urban environments. Of course, only mixed-use building alone cannot create a sustainable cycle, it must be supported by many others practice in order to reach it. The first step is creating a mixed use and good connectivity environment, allied with a safe, comfortable street system, and a supportive social environment.

The idea of a single building where people can live, work and play seem very much of the moment, because of advances in communications and new technologies. But mixed-use development has been into man lifestyle from longtime. Under different configuration and name but everytime the same aim: reduce the distance between private life, activities and distraction. Hundreds of thousands of years ago humankind where digging complex cave systems, Romans built large multi-use complexes across their empire; medieval times, people used to manufacture, sell and live in the same area. The first significant break in this continuity came at the industrial revolution. The advances in mechanical and agricultural technologies brought new processes that required separation from the living spaces because of their toxicity, the dirt and the noise it was requiring. By the time and the evolution from “manufacturing” to a “services” era, the growth of specialised fields and

expertise permitted to separate large scale and small unit of production. The 20th century that came with new technologies powered by the globalization effect favored the comeback of mixed-use development [54].

The world growing population, density in cities centers, limited land and resources are reality that advocate in favor of mix-use building. It is one of the reasons why mixed-use concept is widely promoted to increase density; offering active transportation; encourage economic blossoming, create lively and diverse neighborhoods. As said before it is one of the principles of Smart Growth and sustainability.

However, we know little about mixed-use developments effect on housing affordability and the effective sustainability of the process by which it is run. Many critics can be cited on mixed-use development. The following part of the study will reveal the disadvantages of mixed-use building and point out some advantages that have reverse effect from a side to another.

### **2.2.2. Challenges of Mixed-Use Buildings**

Conduct projects such mixed-use building is generally crossing a cascade of factors that can affect the viability of the project itself. Despite the integration of the primary criterion shown previously mixed-use building concept have many challenges that developers and even user should be aware.

Mixed-use building is often seen as too risky by many developers and lending institutions, as it is advocate in a Financing Progressive Development (a study of Christopher B. Leinberger). In the study, it is explained that finance professionals prefer to invest in single or double use development that are more reliable to make high profit in short and mid-range term. From the feasibility analysis to financing, mixed-use projects usually involve costs and revenues that are hard to predict; furthermore, while some cost efficiencies may be achieved through mixing uses but the complexity of integrating multiple uses into a single structure may raise development and operating costs of some services [55].

From a larger perspective, many argue that the building execution and even the mixed-use concept itself can be anti-urban. For them the idea of mixed-use building is to create a self-

contained little world that people don't have to leave. From this point of view, mixed-use building adds nothing to the city cohesion and can even be harmful for the social layer. In other term Mixed-use building are supposed to be a representation of a city center in another urban context. In fact, closely to the shopping mall concept that was invented at the beginning of the 19th century, mixed-use building is in the 21st century what shopping mall was initially. To know, a miniaturisation at an architectural and services level of a city center [56]. What is then the need to have a "mini" city center in a dense area or in a city center?

Critics have also argued that the environmental protection aspect of mixed-use building is too focused on transport, connection and individual mobility. This range of critics relies on the fact that auto-mobility impact on ecology and greenhouse gas is far from being the most important in urban life cycle. It is about the entire urban metabolism of the city. Also, distances and density are relatively unimportant; it is the total metabolism of the development that determines the environmental impact [57].

Another problem that mixed-use building must deal with is security issues. In fact, inside the building the separation and the access of designated places security and restriction can be a great deal. For example, for privacy and security policies it might not be accepted that shoppers have access to the resident hallways above, this kind of inconvenience obliged to put restriction of hours or additional features that may mirrored on the budget [57]. In the same range keeping noise isolated from one space to the other ones is important. Even if residents do understand that the busy city environment is noisier than suburban home, mixed-used developers must have to deal with sound transfer especially from the public space to the private ones.

From those examples it can be noted that the interaction between density and diversity of use requires innovative design solutions. Then a good design can be used as a way to reduce those risks. Nevertheless, this requires integration of various components within a coherent design scheme so that a harmonious relationship can be created, despite different requirement and specifications of the various uses [59].

Another important critic of mixed-use building goes to the parking issue. Though the hope with mixed-use development is to help reduce the dependence on the automobile, not everyone is embracing that mentality. Plus, more the place is attractive; more the parking

need will be high due to additional visitors coming from others location. Dedicated parking even in high density project can be controlled for residential or retail, but commercial dedicated parking always exceed the needed and can be difficult to control [61]. Prior to the parking problem there is the building scale and ratio to consider. While initiating a mixed-use building it must fit into the existing area in size and context [58]. In fact, mixed-use building for the need of diversification and profitability are generally huge in their size.

This scale problem is both architecturally and environmentally discutable. Architecturally mixed-use building in their size are pretty sure to lose the ability to renew themselves; they are generally created on a concept based on design and high technology features that gave them identity and attractiveness. For instance, mixed-use buildings are today related to "fancy" place even if they are open to the public. After some moment they might lose they audience and give them a second life will be economically unsustainable [62]. Environmentally, the amount of material use to build those huge structures is notch at the urban environment. While looking at the material footprint, we can easily note that construction material are the most pollutant and most of them are end cycle material (non recyclable) [62].

In sum mixed-use building development is a very complex process to drive; it then needs a much-synchronized collaboration between experience and specialization from the design to the management. Diversity and density as it the main purpose of mixed-use building are not only about having various uses within a project to drag people, but it also related to social and cultural insertion. How to ensure security, to deal with noise transfer from the early delivery in the morning to the late-night ambiance through the busy hours. It a critic collaboration that is the concern of both the retailer and the developer.

### **2.3. THE MOST SIGNIFICANT MIXED-USE BUILDING TYPES**

Mixed-used building is a type of building among plenty in the architectural world; but yet mixed-use typology has an undeniable value and impact on architecture environment in the modern world. In fact, mixed-use architecture at the time of globalization is no more limited on the building or the structure it is related to. It lies in integrating neighborhoods rather than just focusing on one single building. This typology requires collaboration

between architects, developers, construction specialists and operators in order to fit in the “new urbanism” [63]. New urbanism is the application of urbanism principles to a scale smaller than a city (from a building to a neighborhood). Those principles are connectivity, walkability, density, quality of life, quality of design, integration of tradition and nature. The all, to create a sustainable environment in order to enhance quality of life for the inhabitant, the users and the city [64]. New urbanism is then a practice linked to the concept of long-term growth. As George Efstathiou said, << it’s equally important for planners, architects, engineers, real estate developers and others who shape the built environment to embrace the new urbanism, mixed-use development and smart growth strategies as they are key to the long-term growth.>>

Mixed-use building which is the typology that housed two or more different building use. This also mean that a given mixed-use building have is own based usage which defined is nature. It is for instance quite difficult to classify mixed-use building base type by a universal rule. Generally inner zoning, Usage ratio or developer given designation are the clue to classify a based type mixed-use building; however, some practice feature and even studies are giving index to how to classify mixed-use building. The Evolution of Urban Form: Typology for Planners and Architects by Brenda Case Scheer, provide a clear comprehension of how to recognize a building type by architectural and functional features. With an introduction to history, theory, and present-day attitudes toward building types it explains how to link academic studies of building types with contemporary practice.

Based on the different existing building categories, this study will split mixed-use building-based type in three group: residential based, commercial and leisure based and as a special group the industrial based. The following part of the study will give further details on each group, those details will in the meantime comfort the grouping choice.

### **2.3.1. Residential Based Type**

A residential building is defined as the building which provides more than half of its floor area for dwelling purposes [65]. In other words, residential building provides sleeping, and minimum or more of the daily living accommodation for a private purpose. The

Organization for Economic Co-operation and Development in 2007 was publishing a paper about residential building which in its text separates residential buildings into two groups. Houses (ground-oriented residential buildings) and other types of residential buildings (hotel, apartment, condominiums, dormitory etc.)

A residential mixed-use building is a project built with the first purpose of housing, in most of the cases in urban context, the density-oriented process makes developers dedicate more than 50 percent of the useful surface to housing and dedicate the rest of the space to other uses [66]. Hotel, living center, apartment or residences are the common designations for this kind of building. The Kampung Admiralty is an example, winner of many awards for both environmental and architectural projects; it is described by the architectural firm as the first integrated public development that brings together a mix of public facilities and services under one roof in Singapore.

This mixed-use building juxtaposes three main usages: housing (upper part), medical center (middle part) and a community plaza (lower part). This proximity to healthcare, social space, commercial and other amenities supports inter-generational bonding and promotes active ageing in place. Located on a 0.9 Ha, the project maximizes land use and is a prototype for meeting the needs of Singapore's ageing population. In fact, the medical center hosts a hospital with an elder care center. This configuration plus some additional childcare and the community park with various activities in a very "green space" permits to bring together young and old to live, eat and play. 104 apartments are provided in two 11-storey blocks (including elderly special designed houses).

The Community Plaza is a fully public space, organized to be a mall but is pedestrianized ground plane and is designed to make it look like a community "living room". The units adopt universal design principles and are designed for natural cross ventilation and optimum daylight.



Figure 2.16. Kampung Admiralty in 2018 (a) Mass plan (b -c) Views [67]

This WOHA's very modern project is even playing an important role on the environmental cycle of his immediate urban neighborhood, as Kampung village is today's a highly densified urban context. Last but not least, Singapore average annual rainfall is around 2340mm but the design of the hydrological system of the building allows for over a million gallons of tap water that can be conserved each year as storm water runoff is stored in the rainwater harvesting tank and reused for irrigation and fire prevention [69].

### 2.3.2. Commercial and Leisure Based Type

A commercial building refers to any construction intended to generate profit ether from a business or professional activity that generate gain or any other income. The tax implications for this kind of building are often different than those for residential buildings [69]. The commercial building type includes office buildings, medical centers, retail stores,



malls and can even encompass hotels and multifamily buildings. The term “commercial” and his definition for “commercial building” can lead to confusion in the architectural world; in fact as defined before commercial building can then take in its range residential building, leisure building and even industrial building; because all these buildings type are based on a profit creation. But in this study the term commercial is closer to the retail definition, to know, a property used for businesses, selling goods and services to customers. This category includes offices, restaurants, shops and every business that provides good and service to a client as final users [70]. Associated to commercial purpose, leisure is put to emphasize the services supplying. Leisure activities are, the quality of an experience or as free time [71]. This definition refers to experience others than the daily and necessary ones (work, studying, eating, sleeping...) or tend to enhance them to a special level. Leisure buildings include sports arenas, stadium, swimming pools, theatres, cinema, Luna Park etc. Commercial and leisure based mixed-use building are good hub in and out of urban center, the fact is that this type of mixed-use building is based on public purpose rather than private purpose as residential or industrial ones. The Lin'an Sports and Culture Center in the city of Lin'an (China) is an example of out of city center hub. The project is a 75000 m<sup>2</sup> area including various activities from sport to shopping and leisure. The Lin'an Sports and Culture Center is house of a sport arena, a stadium, a children's park, a large supermarket, a fitness center, KTV and a variety of catering spaces and a linear commercial belt along the sides of the road plus an inner street meeting the complex appeal of fitness. Known for its landscape, the city of Lin'an found in this project a perfect representation of its environment and its cultural heritage [72].

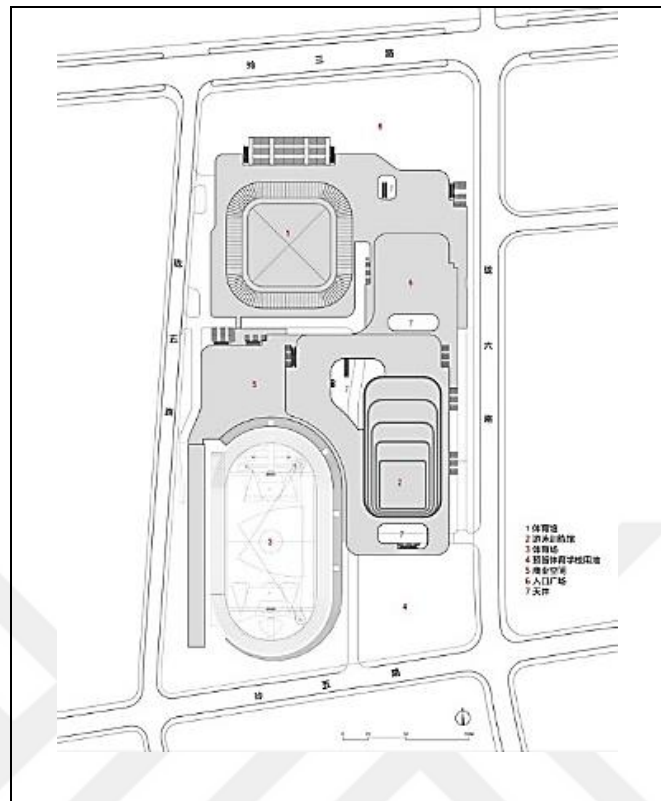


Figure 2.17. Mass plan of the Lin'an Sports and Culture Center [73]

In addition to the design concept, this project is a two-star energy-saving building. Its main measures include several venues set up with roof light pipe, which does not need the indoor lighting during the daytime and can ensure the required brightness in daily use. All platforms are rooftop greening, and the effect of heat insulation is remarkable.



Figure 2.18. Lin'an Sports and Culture Center views [73]

The gradual perforated panel curtain outside the gymnasium provides exterior shading for the building, forming the inner soft light. Advanced heat pump is use along with solar roofing, rainwater collection technology, LED lighting and other mature energy-saving means. The whole sports center has designed several groups of landscaped courtyards and transitional spaces around the courtyard to create a rich spatial experience.

### 2.3.3. Industrial Based Type

Basically, an Industrial building is a building used for industrial activities. An industrial building is then a building design or built to host activities such as manufacturing, repairing, adapting or processing article etc [75]. But many definition and research refer to industrial building as an architectural type from the Industrial Revolution. As cited in a previous chapter, Industrial Revolution with the need of its time (19th century) introduced an architecture based on new technologies with a special use of glass, steel and reinforced concrete and many of the structures of this time marked the beginning of modern architecture. Industrial building then designates an identifiable architectural type and any others building serving industrial purpose.

The industrial world can be separated in two groups: Heavy Industry and Light Industry. Heavy industry is the industry that involves complex or numerous process of production, or large and heavy equipment and facilities (large machines, tools or others element considered heavy for human utilization). This industry regroups chemical industry, electrical industry, automotive industry, machine tool building etc [75]. Because of its need, Heavy Industry generally require large space and can produce disagreement for direct neighborhood. Also, those industries can occur heavy impacts on environment because of the machinery and huge mechanism it involves [76]. This is one of the reasons of zoning implementation in the beginning of the 20th century. Light Industry is the group of industries that usually are more consumer-oriented than business-oriented, as it typically produces smaller consumer goods. Most light industry products are produced for end users rather than as intermediates for use by other industries. Light industry facilities typically have less environmental impact and produce less noise and other disagreement than those associated with heavy industry; and for that reason some zoning laws are allowing them near residential areas [77].

A based industrial mixed-use building is part of a reuse project that includes the rehabilitation and transformation of an existing industrial building or structure with others use added or can be a “new” building aiming to house small-scale manufacturing business (light industry) plus the others uses to arrange [78]. Register on the first range of industrial mixed-use building, the Zeitz Museum of Contemporary Art Africa. It was a grain silo, disused since 1990, and was standing as a monument to the industrial past of Cape Town.

At one time the tallest building in South Africa, now it came back to a new life through its transformation in a contemporary art museum. It is the largest museum of contemporary African art and his diaspora in the world; it has been designed by Heatherwick Studio and opened 22 September 2017 at Cape Town (South Africa).

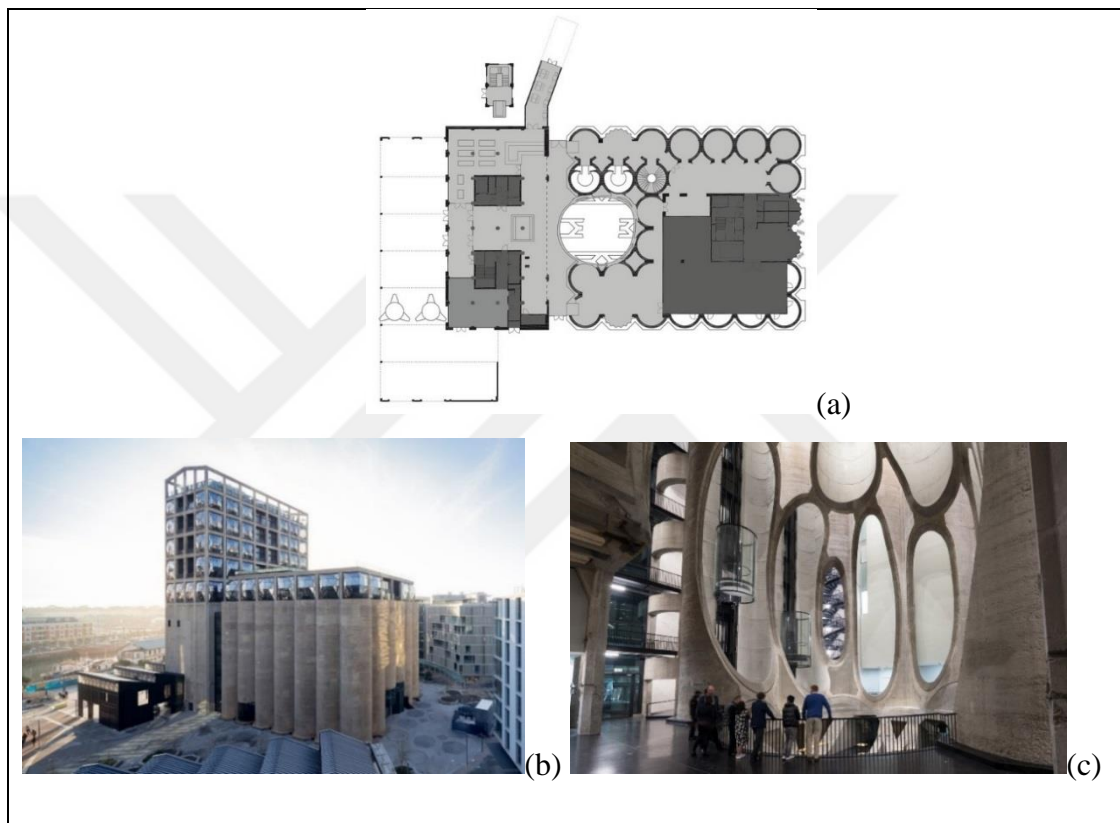


Figure 2.19. Zeitz Museum of Contemporary Art Africa (a) Ground plan; (b) Overall view (c) Inside atrium view [79]

The galleries and the atrium space at the center of the museum have been carved from the silos' dense cellular structure of forty-two tubes that pack the building. The development includes 6,000 m<sup>2</sup> of exhibition space in 80 gallery spaces, a rooftop sculpture garden, state of the art storage and conservation areas, a bookshop, a restaurant, bar, and reading rooms. The museum will also house centers for a costume institute, photography, performative practice and additionally there are 18 educational areas included on one floor. The higher part of the building operates as The Silo Hotel. This nonprofit public cultural institution in

the heart of one of most visited cultural and historical hubs of Africa, have cost almost \$40million [80].

The numerous benefits of mixed-use building make this typology a significant alternative while targeting a sustainable growth in a selected area. It can be a winning proposition for both revitalize an area or to fit in a city center; but master is implementation required a sharp collaboration from is architectural design to his interaction with the neighborhood. Despite the economics, environmental and health benefits, social blossoming is from far the biggest argument to sustain mixed-use development. It is obvious that the modern society has a desire to work and play at the same location. And mixed-use development can fulfills this desire if well planned in accordance with the different needs of smart and long-term growth. Instead of large-scale residential developments or stand-alone, mid to high rise building with single use, many developers and cities rulers are encouraging the shift to smaller infill projects with access to public transportation and commercial opportunities. It creates suburban feel with a powerful sense of place in a limited area [81]. Many advocates that mixed-use development is no longer a matter of luxury and the spread of this typology come as a proof. But if mixed-use building aims and the expectations are clear, their real impacts are to be proved.

The selection of the different project will be based on different international architectural competition. The study chose to rely on architectural competition because it is a good index base, building already have been pre-selected following different conditions that have been verified. In this way it will be easier to regroup project, then the other criteria as country appurtenance and nature (mixed-use building-based type) will be selected by elimination following rank classification. The different architectural completion the study is going to be sourced from are: the World Architectural News Awards (WAN Awards) and the World Architecture Festival Awards (WAF Awards). The selection will start from shortlisted building until nominated ones for each award competition.

### 3. ANALYSES AND IMPACTS OF MIXED-USE BUILDINGS

Mixed-use building concept refers to an architectural development that comprises a mixture of land or uses. In terms of planning regulations, mixed-use refers to land or building used for different functions which fall into more than one use. Recently, mixed-use development became a prominent feature of planning policy, with the aim of revitalizing urban centres to generate diverse benefits for the community it is designed for.

In England, the National Planning Program Guidance (NPPG) in the twelve core planning principles suggests that the promotion of healthy communities should include opportunities for meetings between members of the community who might not otherwise meet each other. [82]. This assessment sounds like a support for mixed-use building which the first aim is to create vitality through density and diversity.

Historically, the architecture of mixed-use buildings is from all ages being represented together with the centralization of the social and active life it cross. In all aspect mixed-use building reflect somehow the identity of the time and space it belongs to (design, technology, scale etc). This is maybe the reason why mixed-use always come back to the trend. From the little settlement of medieval era to today's large scaled building developments. As Coretta Scott King said, "the greatness of a community is most accurately measured by the compassionate actions of its members to each other." Mixed-use building is a community-oriented construction. As it, if the principles of a community are guided by technologies or innovations, the architectural design and the venues of the mixed-use building should match the need in order to be beneficial for the neighborhood it is dedicated.

As mentioned before, mixed-use building development has a lot of presumed advantages and benefits but also many serious disadvantages. If vitality, density and interactivity can be considered as values, they also have no undeniable inconvenient that should be treat will implement a mixed-use project. Even in the case some disadvantages can be minor, some more serious challenges linked to the intrinsic and extrinsic characteristics of mixed-use building are serious matter that can affect the neighborhood and the whole society around.

How mixed-use buildings can practically create positive impacts on the place they belong to? Are the benefices always efficient? Are the results on the societies same from a project to another? Do they only have positive impacts in the context they are raised for?

This part of the study treats the questions above; by analyzing existing projects in different contexts. The cases will be critically explained and compare to understand the practical applications of what the concept of mixed-use buildings is and how it can be beneficial for different societies. The different contexts in which the analyses will be split are countries classification. But many countries classification system exist, some rely on tangible criteria as development level or gross national income; others rely on less quantifiable criteria as social blossoming and quality of life. The countries classification that should be use is one relying on criteria close to the main values on what mixed-use buildings are based. To know: social, economic, environmental and health.

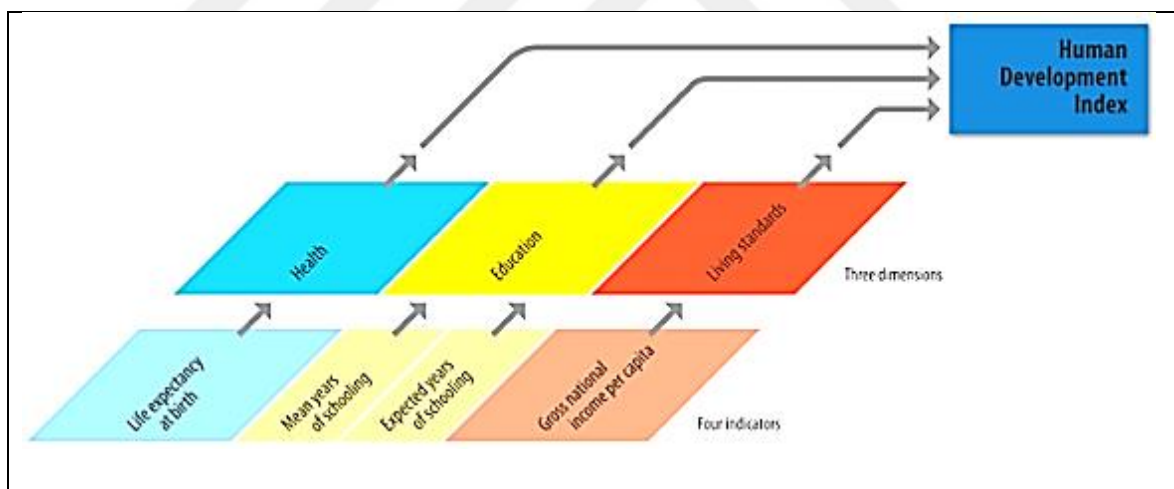


Figure 3.1. Indicators and dimensions of human development Index [83]

After moults comparison, the study concludes that the world countries classification's most close to those criteria is the Human Development Index (HDI). HDI is a statistic based on education (social aspect), per capita income indicators (economic) and index of life expectancy (environmental and health). This classification is one of the most accurate currently use to rank countries and they ability to redistribute the richness into local development and social environment [84]. The HDI is a statistical measure for country's



level of human development. While there is a strong correlation between having a high HDI score and a prosperous economy, this statistic considers how general income is used into education and health opportunities to sort out a level of human development [83]. The following illustration shows this classification by colors.

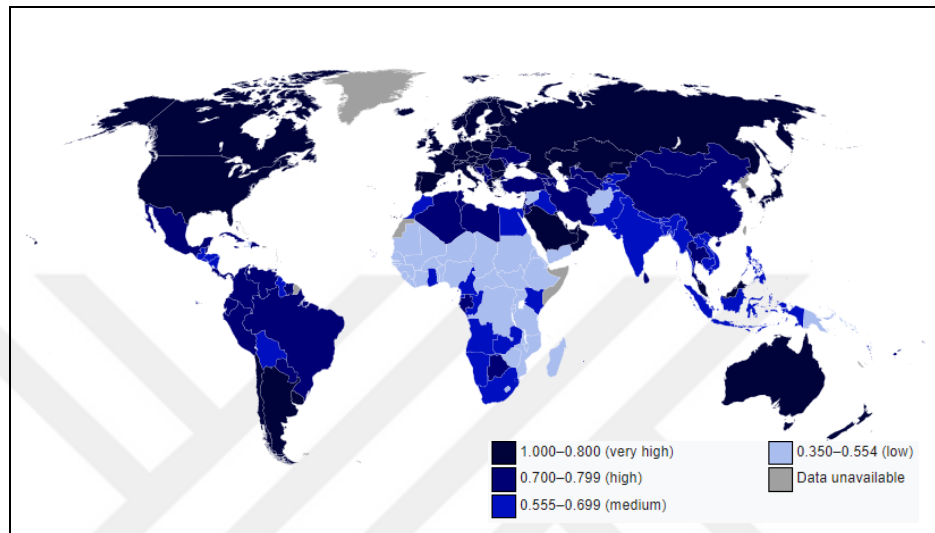


Figure 3.2. World map representing Human Development Index categories [85]

The picture legend advocate 5 group of classification: very high (black), high (dark blue), medium (blue), low (light blue) and the one with unavailable data (grey). Oceania, Asia, and the majority of America and Europe are shade in black and dark blue, Africa is mostly colored in light blue while some countries in the south of Africa and South Asia are blue. This study uses these groups of countries to analyse the mixed-use building development in the different contexts those group of countries present.

Even if the HDI does not consider several factors, such as net wealth per capite or the quality of goods in the countries, the criterions it is based on tend to assimilate high rated countries to developed countries [86]. From this assessment, this study chose to regroup the five categories from the HDI classification in three group: developed countries (Very High), developing countries (High HDI and Medium HDI), underdeveloped countries (Low HDI and Unavailable Data). In the following chapter, this study analyses what mixed-use building stand for in the different categories it split the countries: developed countries, developing countries and in under-developed countries.

What is the general perception of mixed-use building in the different context? What it is meant to create or precondition on those different societies? The study aims to clarify these different parameters in each environment mixed-use buildings are raised for. In each category, two selected projects will be analyzed in order to cover a minimum of diversity in accordance with the fact that there is a multiple combination possible while analyzing the concept of mixed-use buildings,

The selection criteria are based on different international architecture competitions. This study chose to rely on architectural competition as a selection criterion, because it is a reliable index that already selected project with different conditions that have been verified. In this way it is easier to regroup the projects. Other criterias as country appurtenance and nature (mixed-use building-based type) will be selected by elimination following rank classification to shorlisting. In term of architectural competition this study is sourced from is the World Architectural News Awards (WAN Awards). WAN Award is an 11th years old competition showcasing very diverse projects and practices across the world. It might not be the most known or most prestigious award program, but it is undoubtedly among the top award organization. Foremost this study chooses to rely on this competition because it is highly spread around the world and this advantage matches our countries classification criteria.

To get more opportunities to clarify the point but also because of difficulties to reach all the countries categories with the WAN Award, this study extends his source to another architectural competition, the World Architecture Festival.

The program is very particular, it rounds around the world to meet and create more opportunities for architects. Originally settled in Barcelona the festival moves after the first four editions to Singapore and 4 years later to Germany (two years) and it is now taking place in Holland from last year. The festival includes an architecture city tours, an exhibition of high-end manufacturers, fringe events and the entire program in a recreational environment. But the clue of this festival is the architectural competition leading to the awards. This award is a very special in is flow, in fact the shortlisted projects are presented in live audience to the jury. Almost 550 presentations from the different categories. This world class competition his at is 12th edition and include a very large buildings categories, from individual housing to skyscrapers. Among the various reasons

why this study chose the World Architecture Festival as second source, there is the special flow that bring the architecture profession closer to the public and the wide range of building categories that include every scale of project from personal to public usage.

With these two architectural competitions, this study is selecting building following the cited criteria (country classification and mixed-use building-based type) from shortlisted buildings, considering descendent ranking starting from the first price.

### **3.1. MIXED-USE BUILDING IN DEVELOPED COUNTRIES**

The term developed country is a quite ambiguous one; in fact, there is no set definition for this worldwide spread designation. Developed country refers to a country with a relatively high level of economic growth with security and social concern. In general, the definitions refer to the economy or the level of industrialization and per capita income or gross domestic product (GDP). Technologies and services are also concerned [87]. But as measurement of country development there is also the non-economic criteria as levels of education, literacy and health, freedom, political stability and general living standard that can also be used to evaluate the degree of development. This is the main reason this study stance on HDI; because the main impacts advocated by mixed-use building development are not economic at first. The selected buildings are the Monts et Merveilles from Paris and the Department Store from London. Respectively Award of the best mixed-use building of 2016 and second of the best adaptive reuse of 2018 at the WAN Award, the two buildings are quite different in their purpose, size and usage. The difference of those case studies contributes to the understanding of mixed-use typology role and importance in developed countries.

#### **3.1.1. Monts et Merveilles (Paris, France)**

The first project to be analyzed is from Paris (France) and named The Monts et Merveilles (original name in french). Winner of the award for the best mixed-use building at the WAN Awards in 2016 edition. The study selected this building from the 2016 edition because the mixed-use category had been removed from the 2018 and 2017 edition of the completion. In fact, the organization had mentioned that they were registering a low number of the

participant for this category for many reasons. One of the most efficient was the strictest criteria to reach. It can easily be found many mixed-use buildings in other categories like “sustainable building” “adaptive reuse” “commercial building” and many others among the 37 categories of the competition. Fortunately, the mixed-use building category is back for the edition 2019 and the expectations are very high. But there is a particularity from the previous criteria of selection; in fact, the category is open to a mix of uses within a development and not only restricted to a building. Coming back to the selected project, it is important to note that the mixed-use category was showcasing some of the most effective and original mixed-use projects, worldwide. The conditions were very peak; the projects should have a significant combination of two or more uses that work together harmoniously and includes designs that allow further development or changes to the use of space. The building that would have been elected should be an impactful mixed-use development.

Clue of the ambitious eco-district project of Clichy-batignolles, The Monts et Merveilles is a mixed-used building situated in the 17th arrondissement of Paris. It is a project responsible in an environmental as well as a social sense. It proposes a program of diversity and equity of treatment. Horizontally as well as vertically the diversity of programs overlaps one another, sit next to one another, stick to one another, and face one another [88].



Figure 3.3. Monts et Merveilles (master plan) [89].

Formerly a railway enclave, the Monts et Merveilles is reconquering this forgotten piece of Parisian ground. Designed by Jean Bocabeille Architects, this residential based mixed-use building is an answer to the elevated need for housing while paving the way for a durable, mixed-use 21st century city. At the earth of a development project based on strong choices, the building contributes to achieve the goal of an eco-district targeting a sustainable development with the implementation of environmental technologies particularly in terms of renewable energies (heat and electricity), water and waste management. The project housed a social housing, private housing, nursing home, a religious center, and retail businesses. These programs, with their fruitful cohabitation, contribute to the city's growth by providing a strong architectural response to the challenges of urban density and new environmental requirements. It creates collective intelligence as an answer to density [86]. The overall project of this eco-district is based on two needs. The creation of an urban diversity for housing and the extensions of green spaces in an area of Paris where there it is missing. The project then forecast the creation the Martin Luther King Park (10-hectare), with access and paths in the continuity of the existing city, which lies in the heart of the project, apart from the railways and away from the Clichy's Avenue. It represents, with its extensions, nearly 23 percent of the territory and strengthens the creation of green spaces. It is also a real ambition to create an urban diversity by combining social family housings, free and controlled rents, residences for students, young professionals, elderly dependents, shops, public facilities and offices.



Figure 3.4. Clichy-Batignolles Ecodistrict (overall view) [89]

The urban planning was designed by architect and town planner François Gréther, while the landscape was designed by Jacqueline Osty and the OGI engineering firm. The urban planning, based on the existing topography, transforms Clichy-Batignolles into a link between the various surrounding neighborhoods. The project is also an opportunity to strengthen the service in public transportations in this part of the 17th district (the plan includes two metro stations and an extension of the tramway line) and to improve the links between Paris and Clichy. The new Paris Courthouse and the new headquarters of the criminal police are also part of the projet. The city of Paris wanted to make Clichy-Batignolles a model for sustainable urban development, bringing to life through this project its ambitions in terms of mixed functions and social diversity. The project development include building with energy saving efficiency, reduction in greenhouse gas emissions (Climate Plan), geothermal energy (renewable energy for heating and domestic hot water), solar energy and rainwater reuse cycling [90].

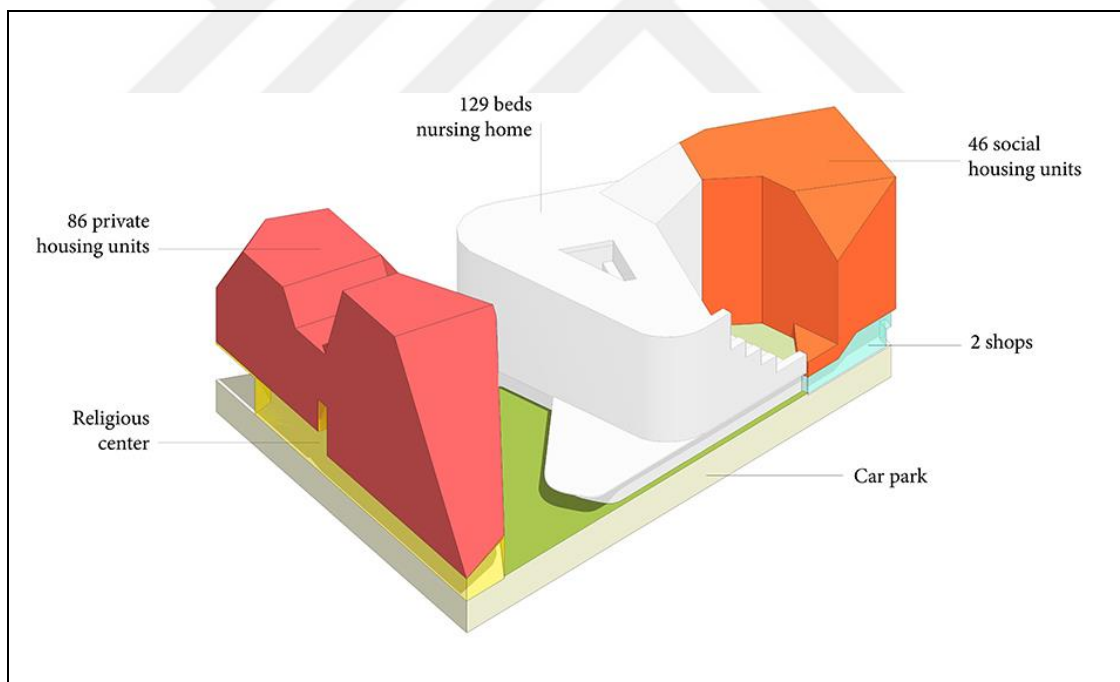


Figure 3.5. Monts et Merveilles (Diagram) [89]

Facing the parc Nelson Mandela and representative of the landscape of the Batignolles, the private residence is an inhabited prism whose physiognomy changes during the day: it is urban on the city side and green on the park side. The 86 apartments have an unrestricted view of the park and the skyline of the Saussure block beyond. Facing northwest onto the

park and southeast onto the interior of the parcel, they all have large terraces facing the park or the gardens. They are protected from direct sunlight by perforated sliding shutters. Clichy-Batignolles has several buildings or structures involved in memory and imagination of the site. The historical heritage is also part of this huge revitalisation project. Behind the Ateliers Berthier by Charles Garnier are the remains of the former bastion of the walls of Thiers, which will be highlighted by the creation of a landscaped area. Also preserved the Pont Cardinet Train Station, the clock building, the forge that will host a food court in the park or a large hall to be eventually reinstalled inside the park.

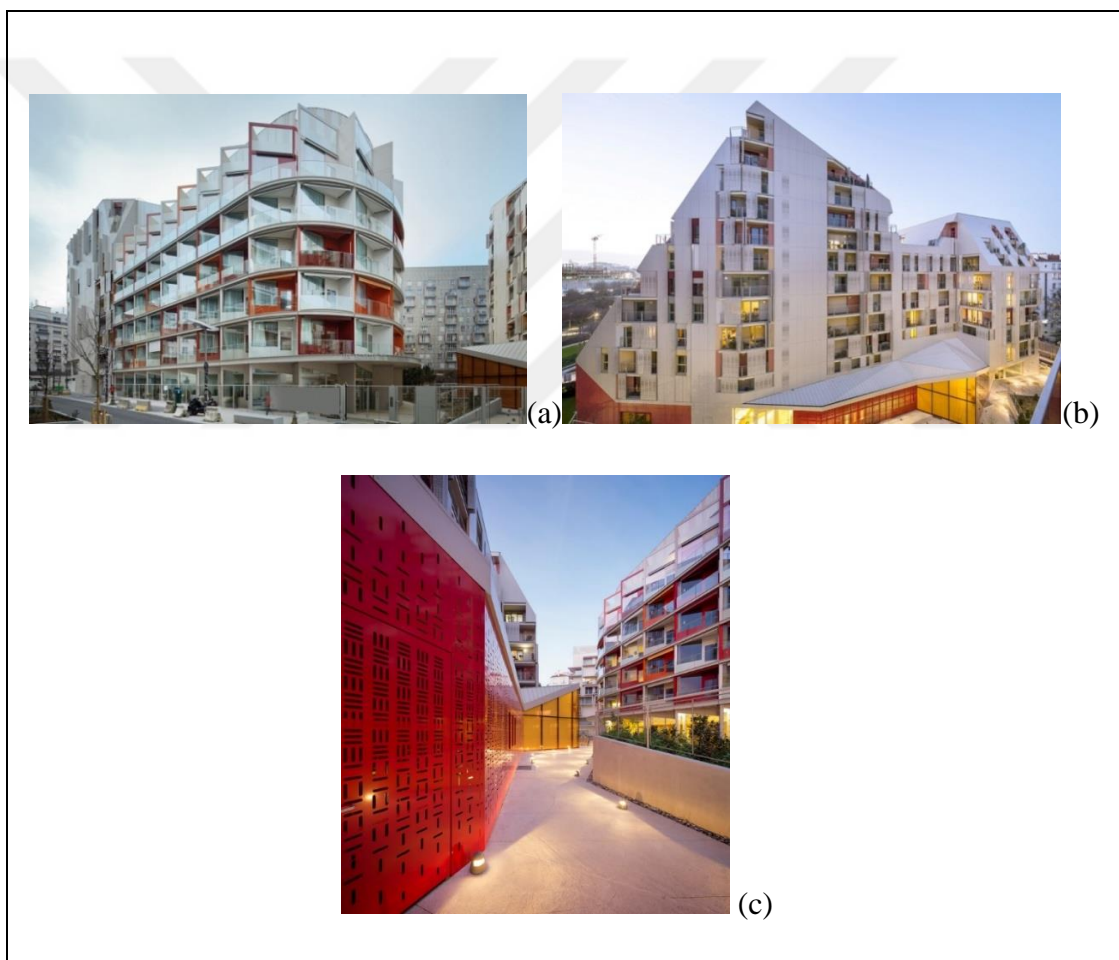


Figure 3.6. Monts et Merveilles (a-b-c views) [91]

In 2007, Paris became one of the first municipalities in the world to adopt a climate action plan, setting goals for greenhouse gas emission reductions above and beyond those outlined by the European Union. Employing virtually all the tools in the green builders' toolkit, Clichy-Batignolles aims to be tangible evidence of the city's commitment to

reducing its carbon footprint as well as an experimental laboratory for testing what's possible in climate-sensitive redevelopment. What used to be a train yard is being turned into an urban park surrounded by energy-efficient buildings that will house 7,500 residents and provide employment for more than 12,000 people [92].

The Monts et Merveilles has a very big social impact, because of the wide urban development it is part of, but also because of the purpose of its construction. As mentioned in the case study, the prior aim of the building is to palliate a lack of qualitative housing in the Paris suburban. On the other hand, the building with its technology and the features is impacting the environment. As the image of the eco-district that it is part of, the Monts et Merveilles is "eco-friendly". Here the controlled scale of the building, the correlation with his neighborhood, the adaptive reuse that characterizes it and the quality of his installation make of this building a significant example for the mixed-use typology.

### **3.1.2. The Department Store (London, England)**

The second project to be analyzed is called The Department Store. Regional winner of the best adaptive reuse project pre-selection of the WAN Award 2018, this building came second at the general ranking of the same category at the final jury. Industrial based mixed-use building; the study chooses to analyze this building because differently to the winner of the category that is an adaptive reuse of an industrial building into another industrial building coupled to a research center.

The Department Store is a former retail shop and fire station turned into a professional hub. The Department Store initially built by James Smith as The Bon Marche in 1876 was inspired by the opulence of the original Bon Marche in Paris. Known as the first steel framed building in the UK, the Bon Marche was an unrivalled shopping destination in Brixton (London). From the 19's to the 20th century, after the World War 2 this building has been a really successful retail destination. But after this period around the 1975, the building started suffering a disinterest of the public, due to the whole neighborhood depreciation after the World War 2 bombing. The reconstruction of the damaged building around didn't change much this matter. From this situation, the building changed variety of occupiers including the British Refugee Council that was housed there until 2012 when the



site fell vacant and subject to squatters. Architects Squire and Partners purchased the tumbledown building in 2015 and entirely reimagined the space counseling historical design and modern usage to create a unique mixed-use building [90].



Figure 3.7. The Department Store (a) 1910 (b) 1959 [94] (c) 2017 [95]

Used to transform and rehabilitate old buildings into contemporary spaces, Squire & Partners, is a London based architectural office. The Department Store is basically their headquarter. The rehabilitation of the building consisted in revealing its commercial and architectural legacy while creating a modern minimalist ambience with an emphasis tribute to craft art. This redevelopment includes the former Brixton Fire Station, which as fusion with the old Bon Marche building to create the new Department Store designed to be a cultural hub. The building composes a design studio with multiple breakout areas, meeting rooms and exhibition spaces, a model-making workshop as well as public facilities such as

a cafe, bar, roof terrace and record shop. The Department Store is a warm presentation of the different facets of the architectural and art practice including a variety of creative and retail units but also housed the Brixton Post Office. By creating inner patio between floors, adding of a rooftop level and the replacement of the old cupola with a stunning crafted glass dome, the Department Store is nowadays an exciting new edifice for his entire neighborhood and designated winner in the Office category at the 2018 Inside World Festival of Interiors Awards [96].

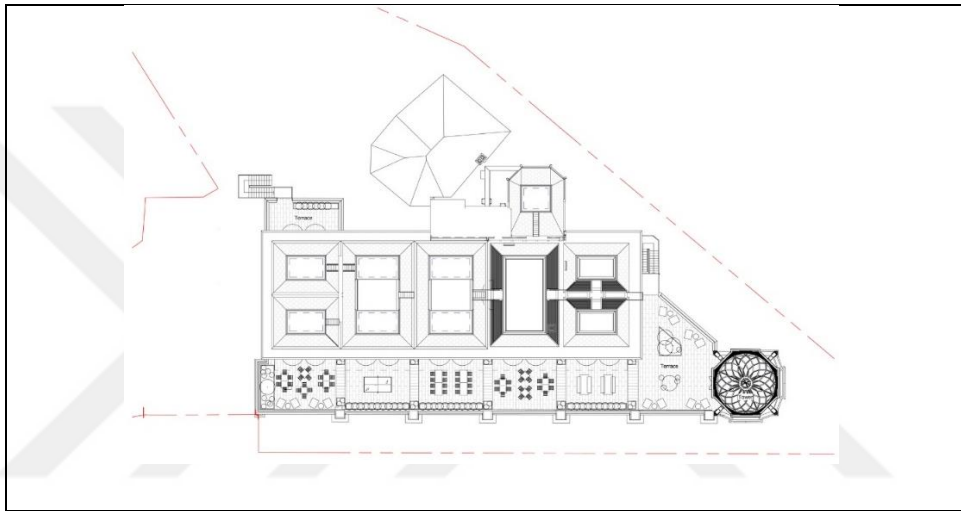


Figure 3.8. The Department store (mass plan) [93]

With its almost triangular plan shape, the Department Store is a 5-floor building with a basement that accommodates a multifunctional open space for various events, a bicycle park, and lockers. At the ground floor, there is a central entrance leading to a main core with a saloon and a gallery, which is presented as an inner patio extending from the basement to the 2nd floor. Various shops and restaurants are arranged around this entrance, each operating autonomously. The three upper stories are entirely devoted to the different departments of Squire and Partners. Architects, designers, and interior decorators work together in a multifaceted environment with large open-space offices delimited by furniture and the building's skeleton. Great conference salons, workshop spaces, and interesting usage of corners and dead areas are integrated into the building structure. The spatial program is completed by a new top story housing a restaurant, bar, and rooftop terrace, enhanced by a relooked tower with a green-glazed cupola. The tower can host meetings or provide a prestigious dining atmosphere [97].

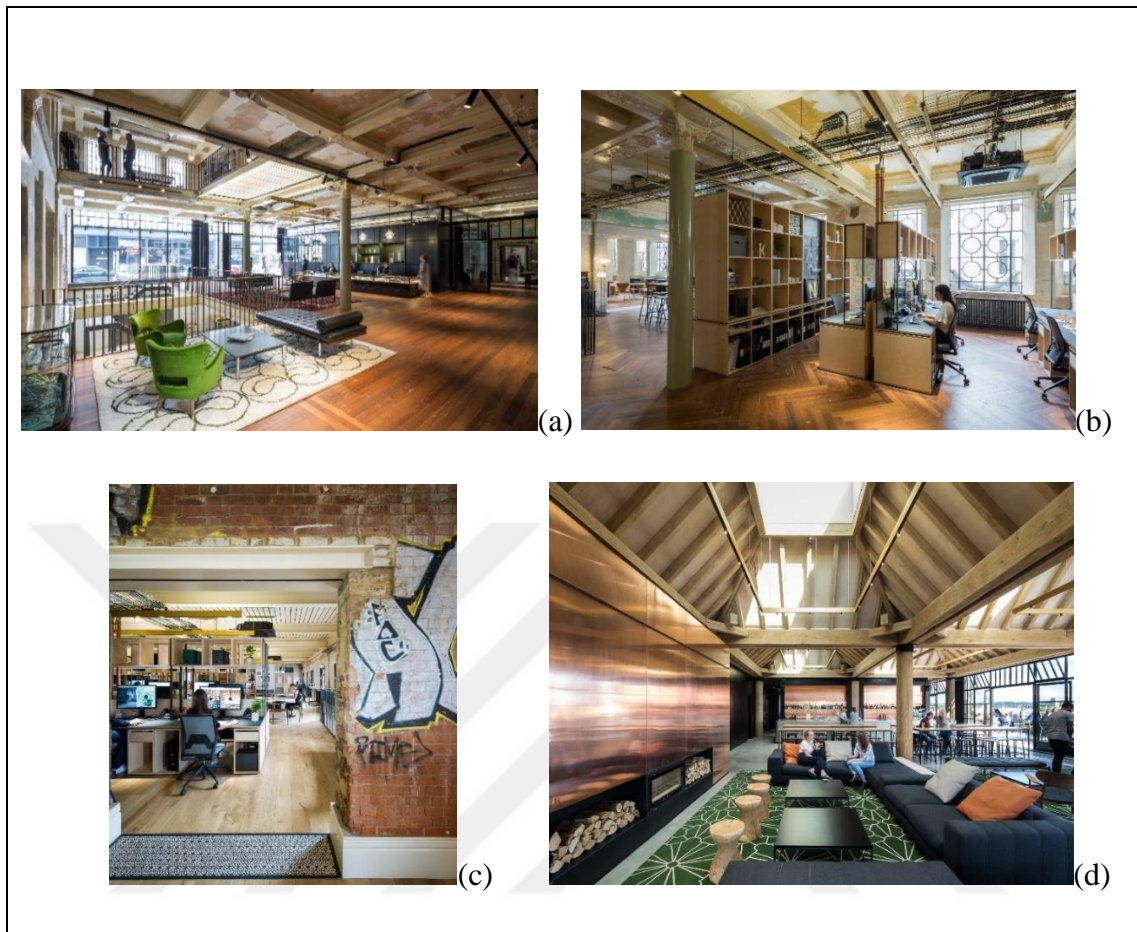


Figure 3.9. The Department store, (a) Main entrance, (b - c - d) Inside views [95]

The whole building interior design is a diverse combination of craft art and modern designer furniture, the atmosphere is a legacy of the long past of the building through the rough brickwork from its original construction and with graffiti from the time it was left unused. These combination of glorious and dramatical history drive by modern interior architecture give the building a certain character and a confirm identity. The fully restored Burmese teak flooring dating from 1906.



Figure 3.10. The Department Store, (a) Facade, (b) Rooftop terrace view [95]

If the interior and the restoration character of the Department Store is a great criterion, the most valuable point is the exterior attractiveness and his impact in the Brixton neighborhood. Known as is best success point, the building exterior has been ‘opened up’ to the neighborhood by is model shop vitrine that gives a glimpse at the impressive hall with his massive furniture. Faithfull to his Edwardian finesse the restauration of the façade along with Along with the original brickwork, stone, marble and terracotta finishes, the building is as attractive as it was at his first hours. The exterior of the building fully activates the street insertion within a dense but serene atmosphere of Brixton [98].

The high ceiling, the large open plan workspaces, the ``window shopping`` encouraging façade of the building make it a vibrant call to interaction and collaboration in both the interior and the exterior. As a standalone development, The Department Store is a successful revitalization project and his mixed-use character makes him more attractive. It is a socio-cultural hub which the creativity in his process perfectly represents the aspect of mixed-use building as a link between past and future through density and diversity. With is almost archaeological approach the re-use of this building gives it a very dandy aspect that make people talking about a certain gentrification of the Brixton Avenue. As it is known gentrification have in is modern use a bad connotation about cost rising, property value and even social fracture. But every neighborhood have is own situation, and critics had maybe forgot that Brixton is historically one of the most prosperous neighborhoods of London. In the past Brixton was one of the leading areas in term of urban innovation, as said before the Department Store is one of the first metallic core building, Brixton was a premier shopping district with one of the first streets with electric lighting at Electric Avenue [99]. Being chic is then part of the Brixton history and it is understandable that the Department Store bring back this light.

From Paris and London, two of the most publicized cities both historically than contemporary on the architecture subject, the first two buildings analyzed are quite different and show the large diversity about mixed-use building topic. The first one as part on an entire urban revitalization development and the other one as a standalone conversion project. Quite different by their usage mixture, the scale even the design approach this building however emanates both from a desire of renewal. It is symptomatically a relevant criterion that is common to developed metropole due to their seniority but also the good control of their urban development in the case of Paris and London [100]. The modern era in old cities is seeing a lot of these redevelopments because of the ages of the buildings but also because of the security, technologies regulation that are changing. Both new and old urbanized cities in developed countries are accommodating to mixed-use development because they offer a most efficient use of land while providing a higher quality of life with a good adequation lifestyle of those dense cities where people sims to better live when they can work and play nearby.

### 3.2. MIXED-USE BUILDING IN DEVELOPING COUNTRIES

As defined before, the ambiguous concept of development makes the denomination developing country difficult to set. However, development evaluation on different criteria separates developed country to developing country by level. Basically, a developing country is a relatively developed country but less developed than a developed country. Tending to reach a certain cap where it will be called developed. But how can this point being set? When and why does a country move from developing to developed?

According to a study conducted on the world development and its convergence, the term "developing" describes a situation at certain time of the evolution of a country. In fact, this study advocates that known worldwide set criteria exist in the countries comparison, so every year despite the previous or the expected progress to come, countries are being classified and named developed, developing or under developed country. To emphasize this rejection of the promise of progress the study mentions that since the late 1990s, developing countries tended to demonstrate higher growth rates than developed countries [101]. As an example the Human Development Index classification was ranking Turkey as a Medium Human Developed Country in 2015, but in 2018 Turkey has been upgraded to High Human Developed Country with 0.791 making it 64th country in the world of this classification [102].

From the cited definition, developing country is less developed than developed country. But this definition can lead to confusion as the gap between them is not clarified. The distance between these two groups of country can be flagrant in terms of infrastructures and services, also in terms of people blossoming and liberty. Some developing countries do have a considerable level of infrastructure but their repartition on the national territory is still precarious. Same thing on the social layer which includes per capita income and safety environment that are generally low [103]. This situation is mirrored on mixed-use building development. The typology might be present with even good examples, but not spread across the country. This is the case for the two countries where are located the buildings to be analyzed. From Iran and Angola, the two buildings are situated in the big cities within dense areas. The Ava Center in Tehran administrative neighborhood and the Lubango Center in the business center of Lubango which is the 3rd city of the country.

### 3.2.1. The Ava Center

The first building to be analyzed in this category is from the Islamic Republic of Iran. Named the Ava Center, the building is retail based one. Shortlisted in the mixed-use category at the World Architecture Festival 2017, the building has won the best Commercial Project of the Year at the Middle East Architect Awards 2018. Situated in the province of Tehran at the intersection of the Movahhed Danesh Street and the Firouzbakhsh St Street at the foothills of the Alborz Mountains. Ava Center is a mix of two main uses; a shopping center and a vertical parking lot. The project has been initiated on the call of the municipality of Tehran in order to resolve the lack of parking in this dense area. The municipality delivered a special authorization to the contractor to permit the addition of two more levels, making the program completion to 4 story commercial space and the 6 others story as carpark. The great deal of the design was to turn the heterogeneous program into a cohesive and an architectural unique project [101].

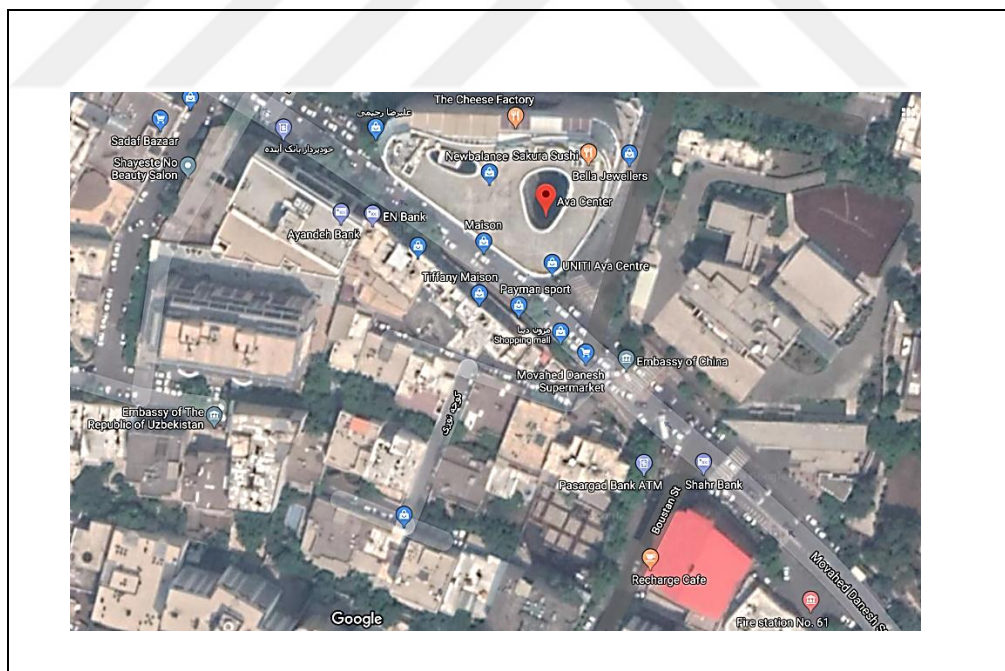


Figure 3.11. Ava Center [105]

The Ava Center is a design by the Fluid Motion architecture firm, which is a Tehran based architecture office. The team representative Catherine Spiridonoff and Reza Daneshmir

said in the official presentation of the building that the focus was to maximize the parking numbers while ensuring safety and fluency between pedestrian and vehicles circulation.

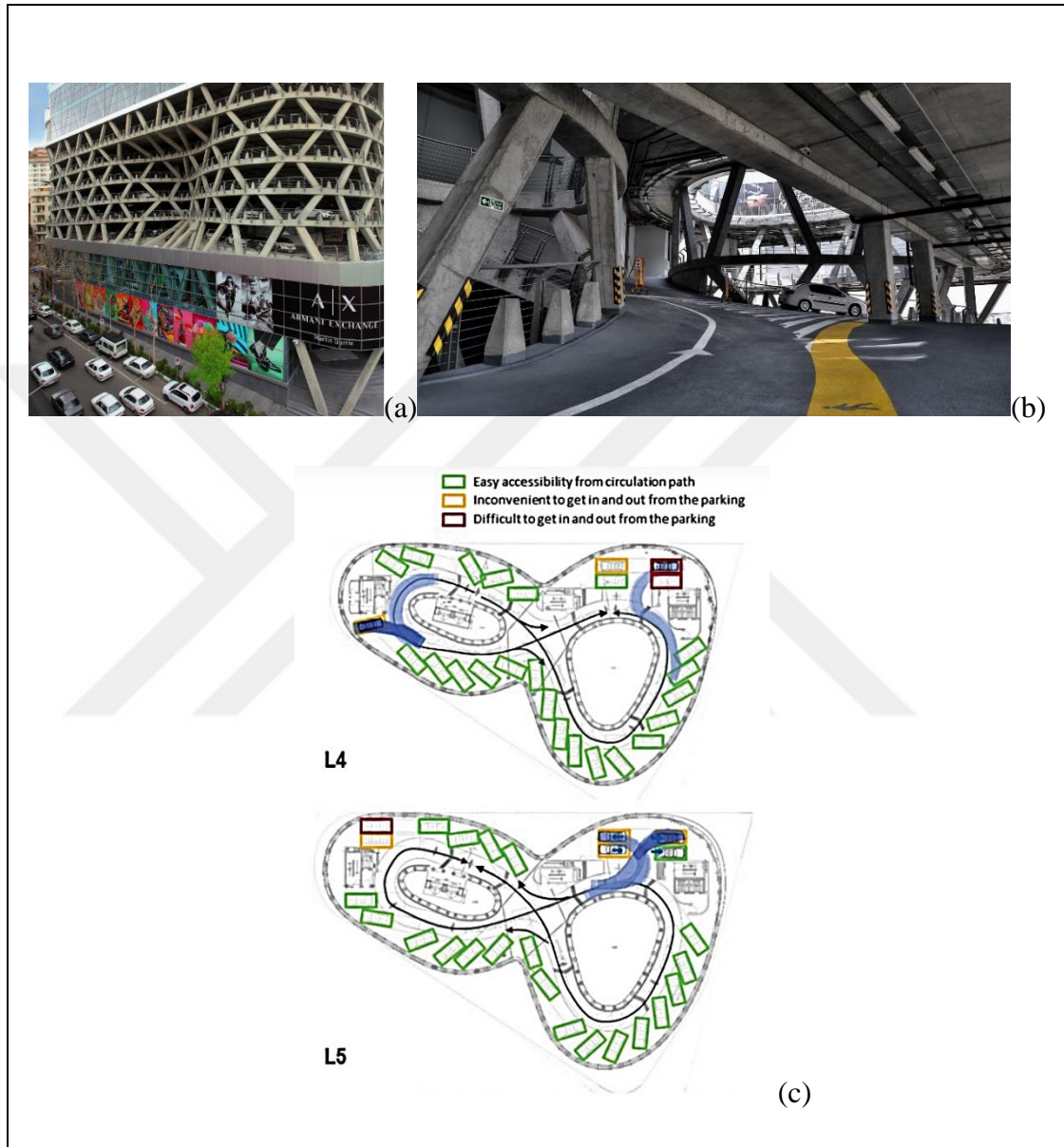


Figure 3.12. Ava Center (a) Outside parking view, (b) Inside parking view [106] (c) Parking analysis [107]

Wisely displayed, the general inside circulation of the building have been quietly mastered by the developers. The accessibility of the building itself have been meticulously analyzed to reduce the probable traffic occasioned by the development. The operation system has been tough and designed from the parking model to the coast of the park place and the



annex services that may facilitate the development performance. With a capacity of more than 400 parking slot, the building host 9 story of parking among the 13 level of the building. It is in total 19500 m<sup>2</sup> of parking out of the 31000 m<sup>2</sup> of the useful surface [108].

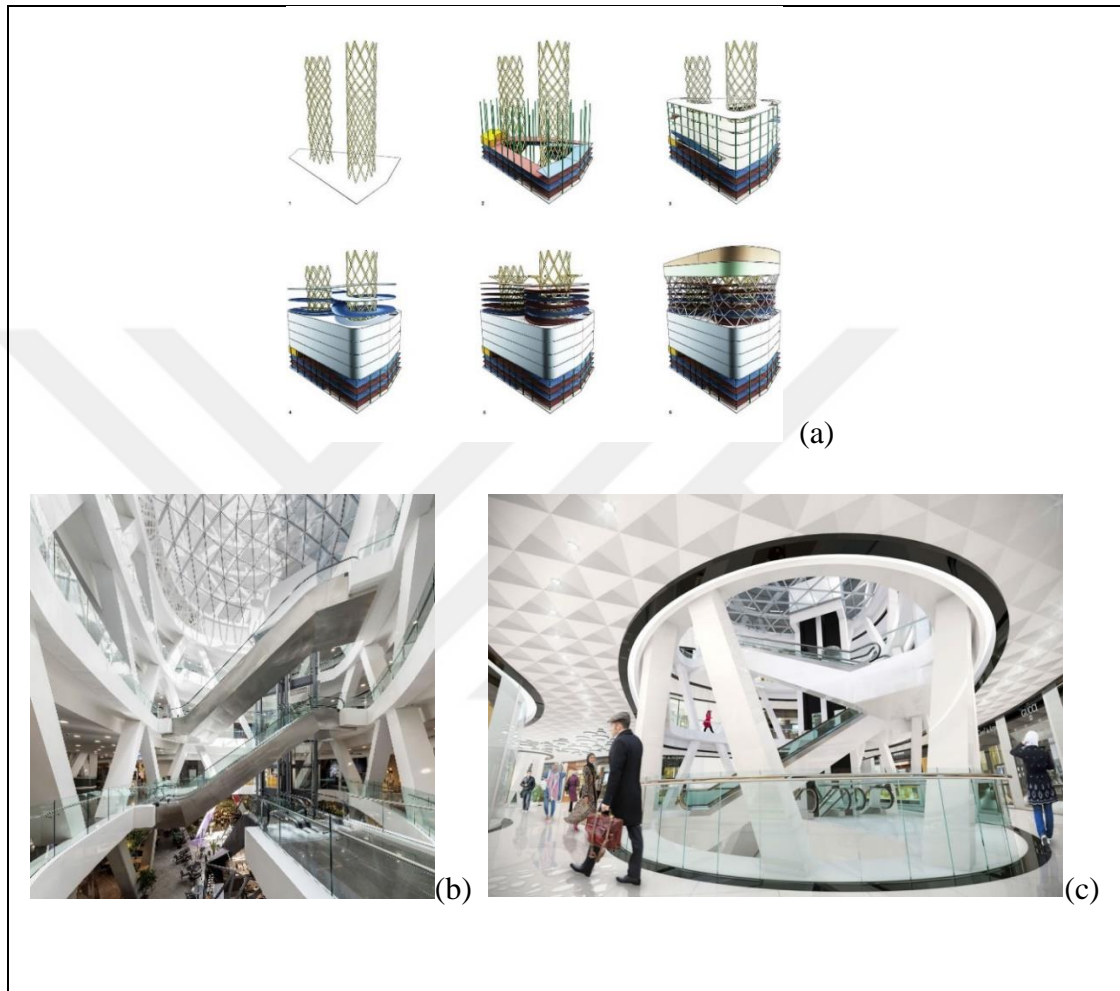


Figure 3.13. Ava Center (a) Concept evolution, (b - c) Inside shopping court view [109]

The eighth level, with the area of 2,000 square meters, has been reserved for cultural activities. Lastly, the ninth floor, with an area of 1,600 square meters, has been assigned the function of the restaurant. Notwithstanding the small area of the remaining space, the shopping area still remarkably displayed. It is also important to note that a parking at the base is not a space design to be attractive.

Concealing two spaces with opposite logic of attractiveness in a single design is a very difficult exercise to do. But the Fluid Motion Architecture successfully did it, their architectural concept manage to arrange this mix in a continuous spatial loop-based plan

which take the form of the number 8. This infinity sign floor plan allows cars circulation between the levels in a continuous and fluid manner. With the dynamic volume this plan creates, it also regulates both circulation and park ease in most of the cases. This plan form also permitted to create two atriums by carving the two loops to allow a massive flow of natural light to enter the building [109].

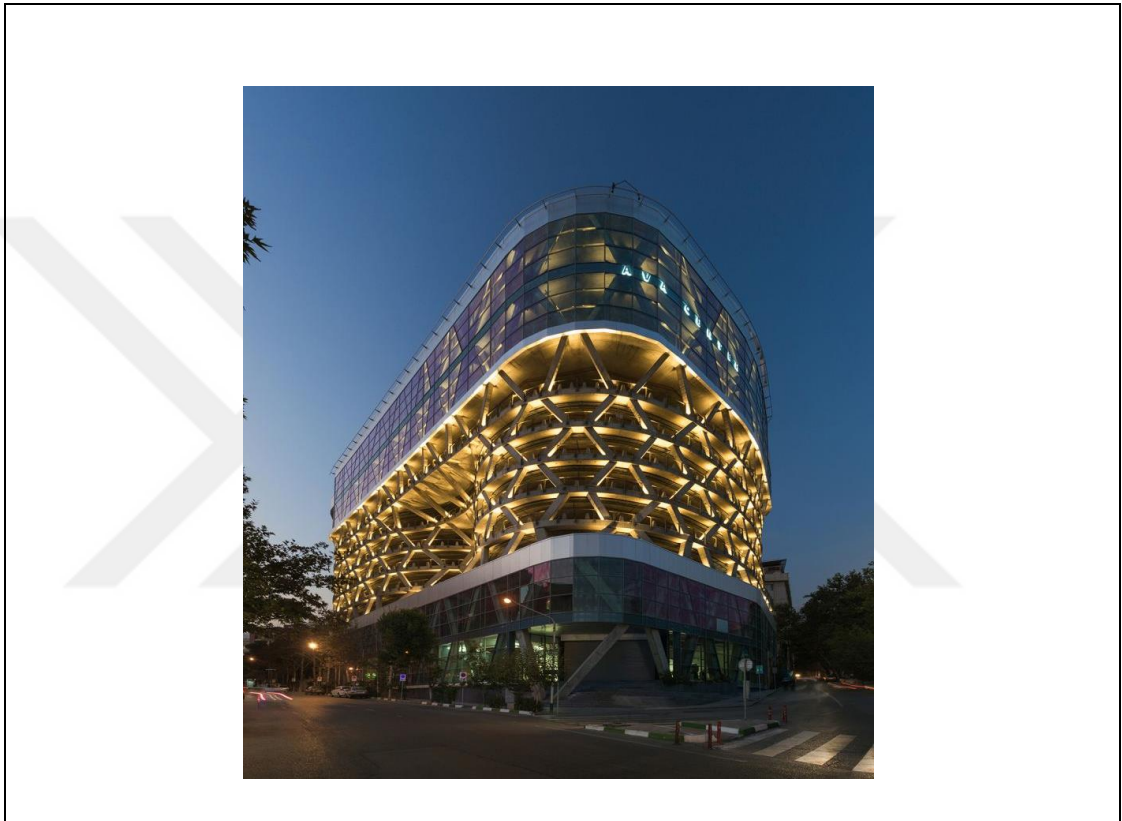


Figure 3.14. The Ava Center [106]

Situated in the administrative center of Tehran, the Ava Center is surrounded by embassies, cultural places and banks. A very well attended area daily, as the entire administrative center in big cities. Large public parking is generally recommended in such zone and the call of the municipality with the ease accorded to the development is a clear point to his necessity. The very modern design of this association of a high range shopping mall and a parking, made the Ava Center a good ambassador to the mixed-use typology. Along forum and social media customers and local guide seems satisfy by the parking implementation and the shopping mall within. Mostly, if the parking is very used by the weekdays by various users came for various business all around, the shopping mall is a

very demanded destination by weekend. Then the two usage of the building have intrinsically separated rush time. This fact is very Important to underline because if both usage were simultaneously in high demand the building would have failed his main purpose of impacting the traffic and parking problem in the area.

### **3.2.2. The Lubango Center (Lubango, Angola)**

From another developing country, the second analyzed building is located in the center of Lubango, which is a midsize city in the zone afflicted by the war in the past of the country. Angola is a Southern African nation whose economy has recently moved from a catastrophic situation due to a long civil war, to one of the fastest-growing economy in Africa with an average GDP growth of 20 percent between 2005 and 2007. Furthermore, a private institution specializes on African economy, known as Making Finance Work for Africa produce a report mentioning Angola has the world's highest annual average GDP growth, at 11.1 percent on the period 2001 – 2010 [110].

Shortlisted at the 2017 edition of the Architectural Festival Award in the category Mixed Use Completed Buildings this 9-storey building includes apartments, offices, shops and underground parking. This Mixed-use office-based building has been designed by Promontorio, an international architecture firm founded in Lisbon in 1990.

The Lubango Center, from his name has also been award for the Excellent Communications Design Architecture price at the Germain Design Award 2018. Described by the jury, as a calling card, this building with his very cubic structure is imposing by his eight and is unique aspect. The opposition created by the natural shading of brickwork and the in-between concrete slabs creates a curious linear pattern enlighten the different floor and emphasize the structural form of the building [111].



Figure 3.15. Lubango Center location [112]

Situated at the heart of this this small town, next to the main public square, the building is a one kind architecture among other building from the Portuguese modernist legacy. The city is one of the main references to Portuguese colonial urbanism in Africa, yet almost all the building of this heritage looks dilapidated in the area. Characterized by, his wide blind façade and the deeply recessed balconies, this mixed-use building is mostly recognizable by his brown brick color that recalls the tones of traditional African clay use for construction and pottery [113].

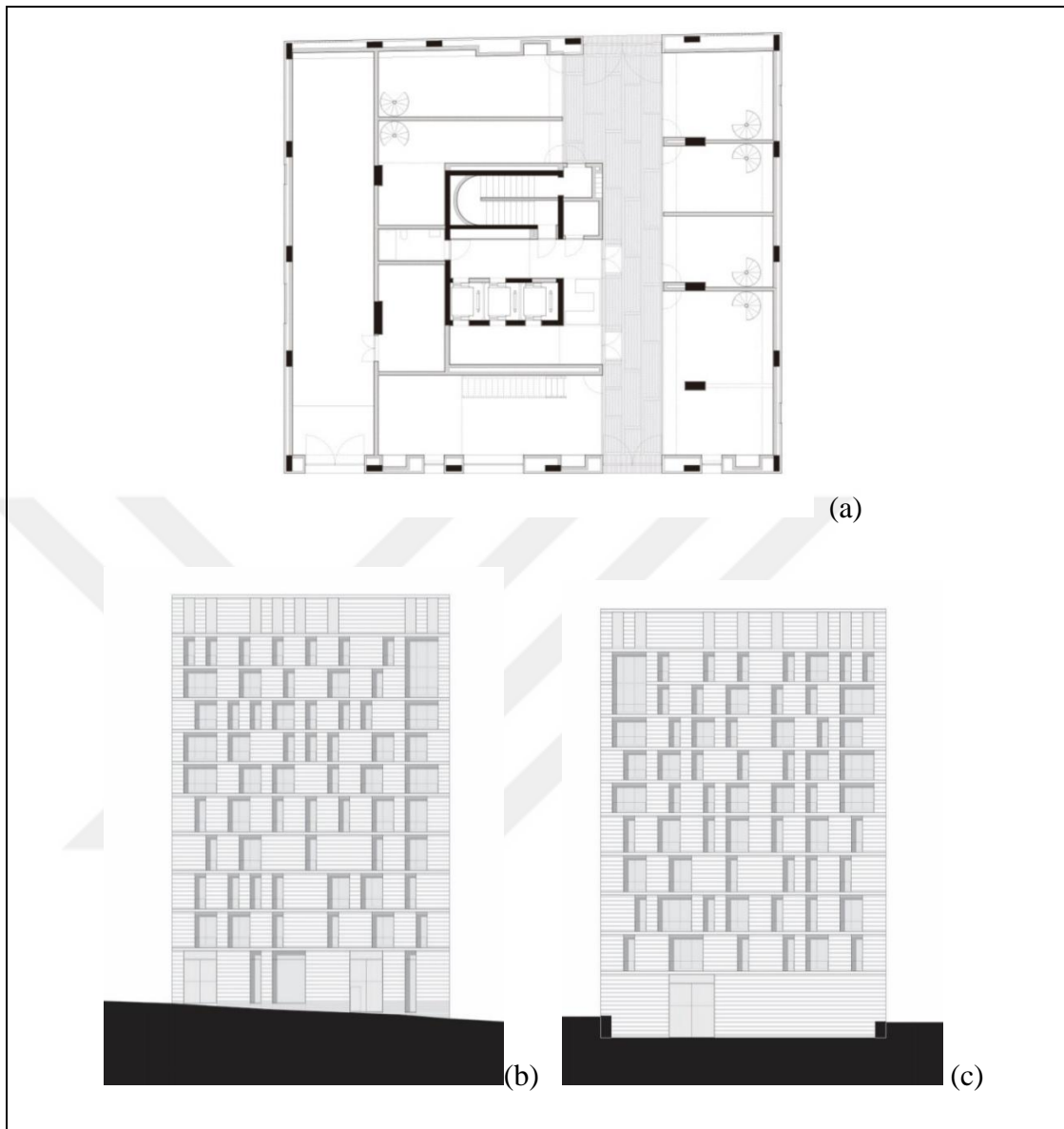


Figure 3.16. Lubango Center (a) Ground level plan (b) Main Facade (c) Back facade [112]

Few materials have been involved on the façade design to ensure both longevity and low maintenance. Brick on their natural looking, concrete slab paint in white and aluminum also painted in white. As explained by the architects "the massiveness of the masonry walls is interrupted by the datum of concrete slabs, which function as a continuous lintel". The main façade present recessed and perforated sections in the brickwork to allow wind circulation helping ventilation of the rooms [114].

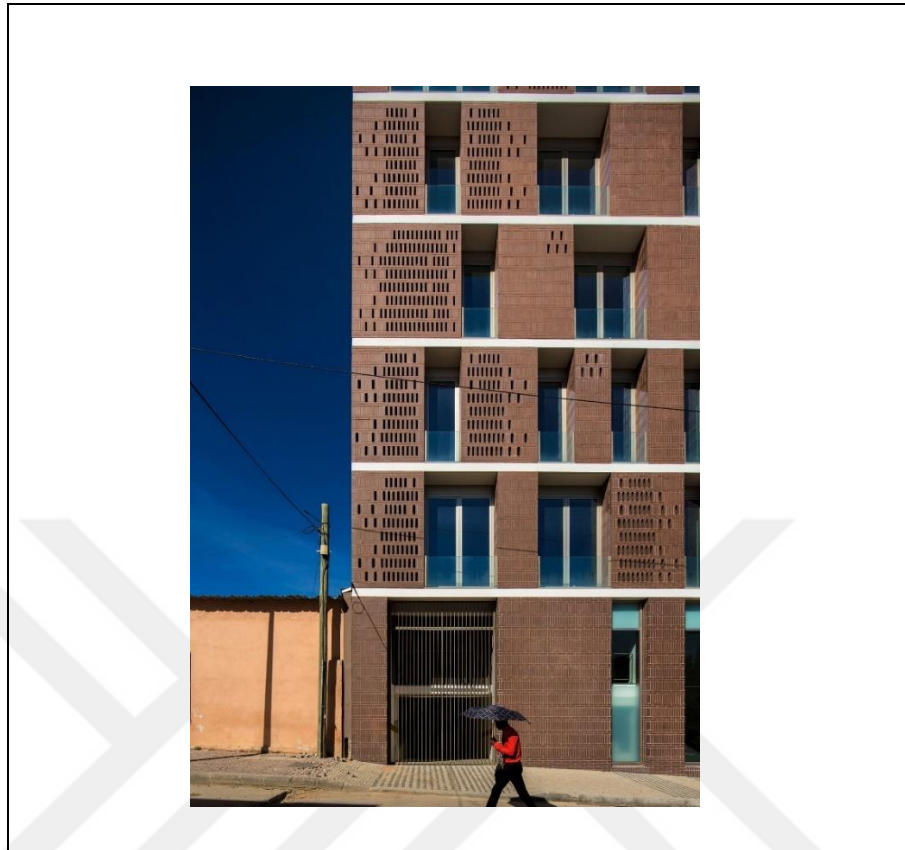


Figure 3.17. Lubango Center (Main façade) [115]

As a mixed-use building, the Lubango center separate is usage by zones established on different level. We have basically 2 zones, the public open one and the private dedicated other. Both zones can be divided in two, the public open one is the smallest in term of area. It is established on the ground and the last up floor. The ground floor is composed of an open gallery generating a shaded and fresh space while serving of distribution zone for the shops, the small backyard coffee-shop terrace and giving access to the residential and offices lobbies. On the other hand, the roof terrace is a common place for the residents, housing storage rooms and laundry services. The private zone is established on the rest of the stories, from the first level there is four levels of offices and 5 levels of vary apartments [116].

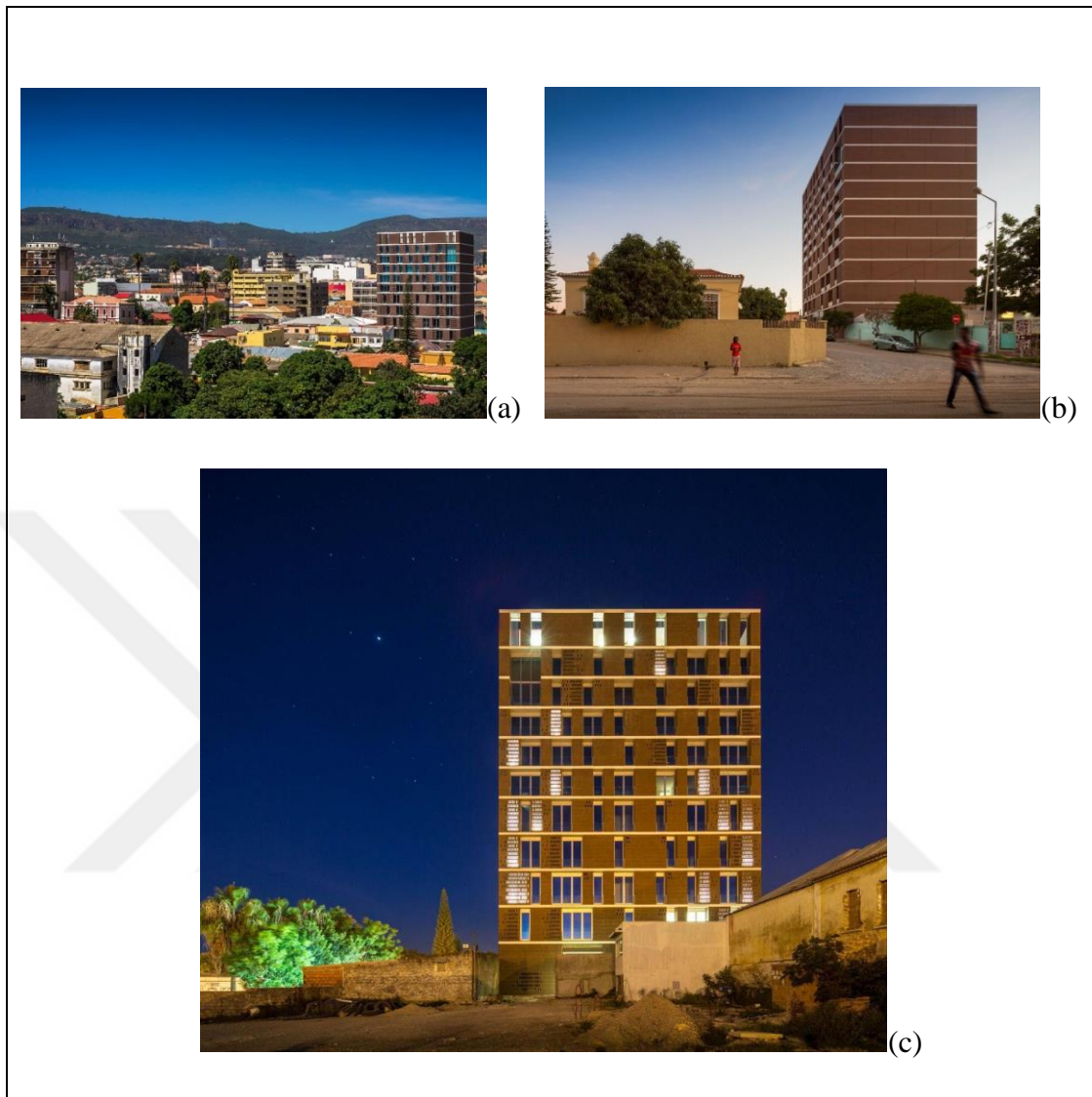


Figure 3.18. Lubango Center (a- b - c) Different views of the building [115]

The nine-story, mixed use building was created for developer Gestimovel which is a real estate company specialize in condominium. The building conception was oriented by durability comfort in and low maintenance efficiency. All the features that characterize the building are in accordance with this concept. The brickwork with is temperature accommodation, presented on his original color that is avoiding painting fees and immunity against the dusty atmosphere. The recessed balconies that avoids sun exposition in this area with often high temperature. The ventilation enhanced with the void in the facades. The minimalist style of the inside design is a modern touch for this building so evocative of the rich textures and colors of African culture.

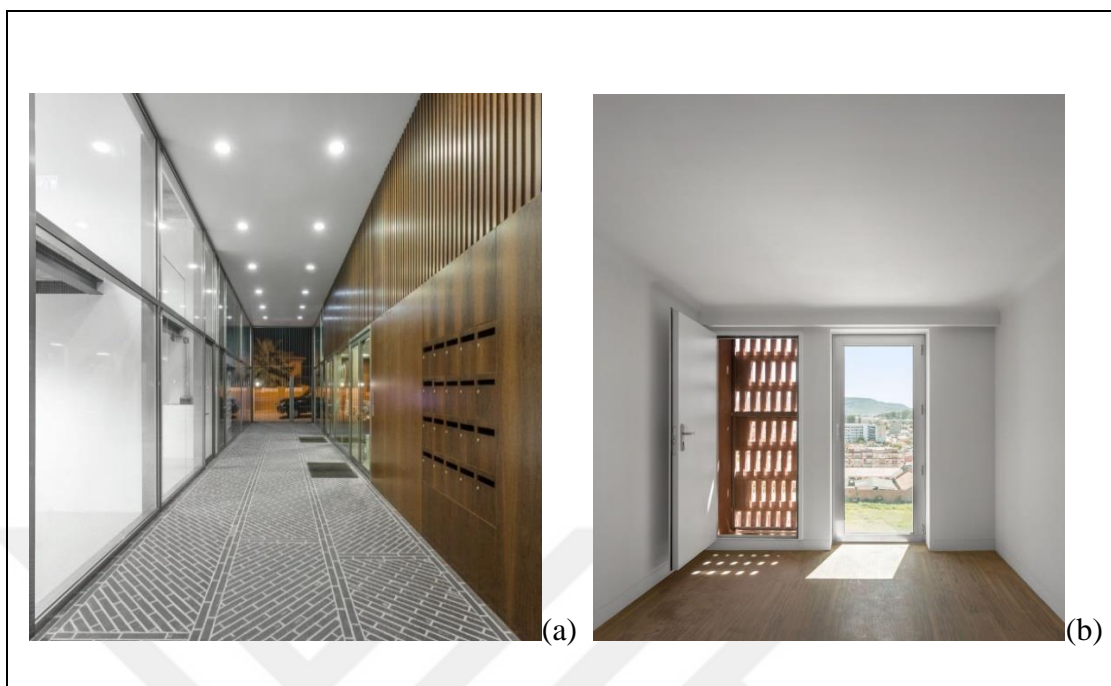


Figure 3.19. Lubango Center (a- b) Different views of the inside building [115]

If everything opposes these two buildings, there is an important aspect not underlined that make them closer than it looks. The flexibility of the buildings to another usage. In fact, both building can be easily reused for others utilization than the ones they have been designed for. At the Middle East Award, the Judges advocate that the Ava Center parking as designed as open spaces can easily been transformed for many other uses. Same allegations where announced by Paulo Martins Barata (architect partner at Promontorio). Proud of his posts and bean system around concrete inner core, the architect sustain that the building can be turn to other usages without much difficulty. This is a good point for those building along with the fact that they are middle size building both their scale and they structure are a wide-open gate to reusage and by ricochets to sustainability.

These two case studies show different ways for mixed-use building to play an important role in the direct neighborhood. If a parking dedicated building was constructed it could have solved the problem but adding a second use, ensure an advantage on the space and create a capital gain that allow different users and create a dynamic space. The Lubango Centre for his part bring an enhancement to the quality of life and services around. In an area where buildings are from another time, it brings fresher and verticality without being too much different by his simplicity and the choice of material. The correlation with the



neighborhood is balanced and make the building “the place to be” as the purpose of his construction asked.

### **3.3. MIXED-USE BUILDINGS IN UNDER DEVELOPED COUNTRIES**

Underdeveloped country is the term use to designate the poorest countries in the world. On the lowest Human Development Index range, underdeveloped countries exhibit precarious economic, difficult access to health and insufficient public services. In such countries, population live with less than \$1200 according to the Department of Economic & Social Affairs of the United Nation [117]. With 24 countries in 2009 the Low Human Development Index category counts 38 countries in 2018. With 35 countries out of the 38, Africa is the most represented continent of the category [85]. Development is a term more related to economic environment, even if it is strongly linked to political and social life. People perceive it as a general aspect of civilization’s life, development and his categorization of countries appear nowadays as dichotomy between “rich and poor”. But important factors as culture and ideology are not negligible reality that has effect on social life, even more than economic does. If the general quality of life leaves desired in those countries, most of them are not unlivable as they might look while considering the general bias about development as a global aspect [118]. Architectural sphere is for its part strongly linked to cultural and social and religious life. Even if the infrastructures are not enough and generally weakly evolved, today’s underdeveloped countries have generally a rich architectural background due to colonization. Their late independence that made them relatively young countries is quite a contrast thankfully to globalization and his effect. In fact, despite the historic and cultural architecture, underdeveloped countries are following the trend of global architecture evolution. It is frequent to found very well elaborated private and public development across the cities in underdeveloped countries. In 2017 the Africa Property Investment (API) Awards proudly advocate for innovation and outstanding achievement in the entire property industry. From retails development through mixed-Use building to high-rise Development and even worldwide gusto like green building, standards are getting exceptionally high in underdeveloped countries. Rwanda, Kenya, Ghana, from everywhere in the sub Saharan Africa a string of world-class buildings is appearing. Young African architects are now showing themselves outside the borders of

Africa, and furthermore at an honorable level [119]. The building to be analyzed in the underdeveloped category are outcome the African Property Investment awards. Old of ten years, the API Awards is the largest Africa summit reassembling real estate and architecture. The competition at the earth of this summit covers 13 categories including mixed-use buildings. The criterias are very selective, and the construction of the building must be completed at least one year before the submission.

Rather absent on the architectural atmosphere of underdeveloped countries, mixed-use building typology however have some examples here and there. The Kigali heights from Rwanda and the Torres Rani Towers from Mozambique are good example for the typology implementation into underdeveloped countries. Like in developing countries cases, both building have been constructed in the capital city of their respective country. The influence generally coming from the biggest city is it a good beginning for an introduction of mixed-use building development. The study of those buildings will permit the study to understand how mixed-use building can impact urban life in underdeveloped countries.

### **3.3.1. The Kigali Heights (Kigali, Rwanda)**

The first analysis for underdeveloped country goes for the laureate buildings of the best mixed-use building category at the 2018 edition of the API Awards. Named Kigali Heights, the building is a commercial based type. Developed in the capital city of Rwanda, this building is a gateway of the city that it wears the name. Blending 12.750 m<sup>2</sup> of A class offices, 5.250 m<sup>2</sup> of retail spaces and 300 car parking nearly 4000 m<sup>2</sup>. The building has been elected best mixed-use building for many reasons. First, his careful site analysis which took in considerations the Kimihurura subarea masterplan and the building integration in his immediate environment. Secondly, the access strategy with welcoming interference to the street and his public frontage developed with a colonnade at ground level. Finally, the building overall design concept with his different volumes, balanced by the variety of levels and materials [120].



Figure 3.20. Kigali Heights (concept evolution) [121]

The 18 000 sqm development was designed with flexibility and energy efficiency at its core. Kigali Heights is equipped with a lot of modern features, especially his ecofriendly solutions along with a solar powering. The in-house sewerage treatment plant is the first ever in Rwanda [122]. The larger part of the program provides elegant offices. They are moduable by their modern layout that allow creation of either open workspace or separated offices. The sixth floor of the office block on his extension offer a rooftop terrace hosting event and ceremonies, it has also served for music video shootings. On the same dynamic as the office moduable floor plan, the leisure part of the building provides various sizes of units from 50 m<sup>2</sup> to 100 m<sup>2</sup>. This part of the building exhibits the welcome interface of the building with open walls follows by a raw of plant and trees serving as screen separation for the street level shops. At the first floor we have an extension terrace housing restaurant and bars, a social hub ambiance really appreciated and well attended [123].

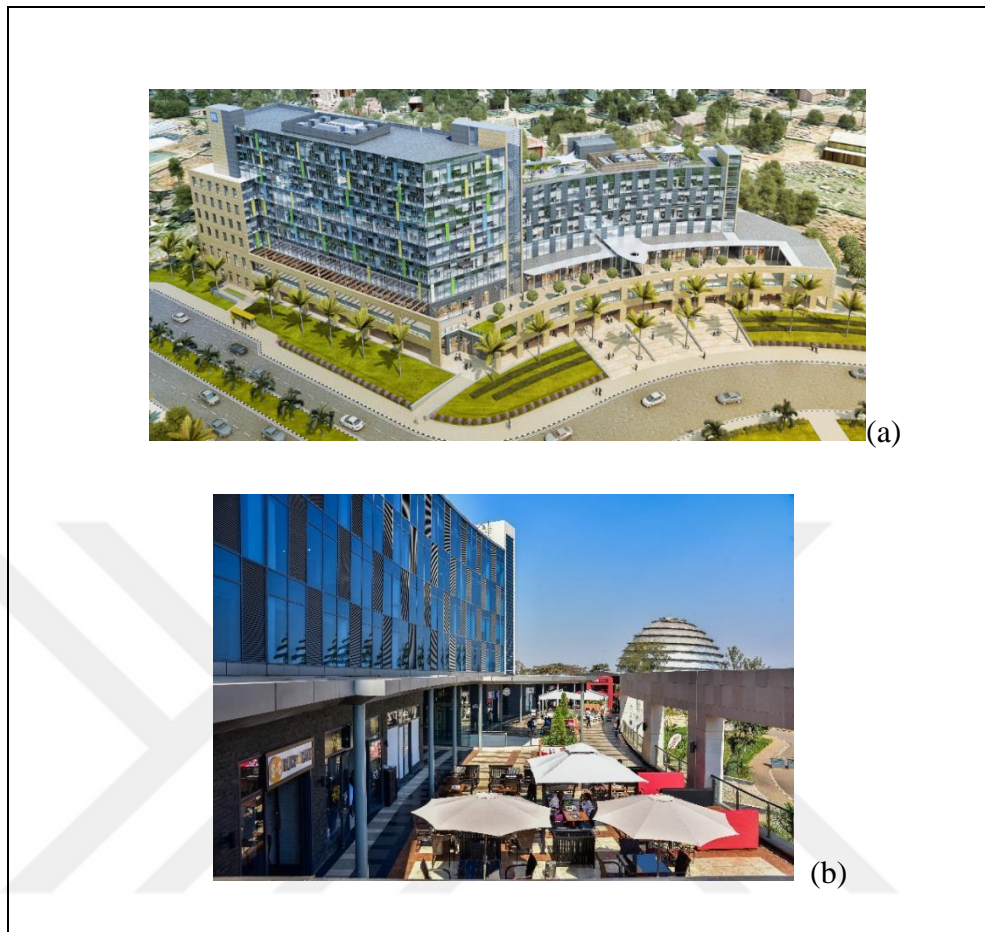


Figure 3.21. Kigali Heights (a) Main façade views (b) View of the retail terrace [124].

The Vavaki Architects jewel is today described by professional and users as the ultimate corporate and retail address in the capital. The location is also one of the main reasons the building is attracting that much attention. Kimihurura district have been planned with a strong dedication for public realm and his massive roundabout with the transitions between hard and soft space are a proof. Surely the Kigali Heights is an impressive and good example for the mixed-use typology and even all the architectural climate, but he becomes a more accomplished building when looking his direct neighborhood. In fact, the masterplan of the district has been prepared as a complete mixed-use development. Promenade, hotel, national convention center, residential medium and high density, all this program across green land and massive park. The area is one of the most popular areas of Kigali.



Figure 3.22. Sky view of the immediate surrounding of the Kigali Heights [125]

The Kigali Heights is today a landmark of Kigali city and offer a unique building experience. With its technological features and its flexible floor plan management, the building is an example which both challenge and inspire mixed-use typology development particularly in the region and generally underdeveloped countries. Mixed-use building success is intrinsically linked to the building purpose firstly and secondly to the building attractiveness and its management. Very faithful to its aim, the Kigali Heights was built to bring professional spaces among the plethora of housing of the neighborhood. In fact, the Kimihurura neighborhood is a residential orientate mixed-use district and the Kigali Heights should bring A class offices to create diversity. By bringing both offices and retails the building becomes the number one attraction. Mr. Charles Haba (Manager of Century Real Estate) advocate in his interview with The News Time; over 90 percent of the available retail and 40 percent of office space have already been booked before the official opening of the building. Today, the Kigali Heights is social hub in the area and even increase the demand for the building nearby as the Radisson blu (hotel) [126].

### **3.3.2. The Torres Rani Towers (Maputo, Mozambique)**

The second building to analyze is from an eastern country of Africa. The subject is from Maputo, the capital city of Mozambique. Mostly known internationally for his clear and stunning beaches, the country has a great tourism potential. The multiple island and others natural site as national parks and the rich marine biodiversity constitute for the national authority a good potential on what the gross domestic program can rely in the coming years [127]. Laureate of the Emerging Markets category in 2013 at the Cityscape Global Awards, winner of the Best Architectural Design Award at the API 2017, Excellence Award winner at the SAPOA Award for Innovative International Developments, the Torres Rani Towers is a mixed-use building designed by the DSA Architects International. Residential based type, the Torres Rani Towers is a bi-tower building mount on a three stories podium. The tower dedicated to residential purpose offers more than 180 furnished apartments from one to three bedrooms dispatched on 18 stories, and the second tower includes 224.000 m<sup>2</sup> of office space housed on 14 stories. The South-African based Architect firm have designed very modern and iconic building that adds a new dimension to the cityscape as a symbol of flourishing economic situation in the country [128].

At footsteps away from the Maputo waterfront, the Torres Rani Towers is a place to live work and relax. His façade present solar glazing that allows large views from the apartment and a precast concrete that allow the sinuous organic form of the towers. The most attractive thing about the building is the alloy of the design and the program that are reflecting one to another as form follow function. The building amenities include two swimming pools, children's play area, restaurants as well as lounges and gymnasium and parking garage and a retail area servicing both towers [128].

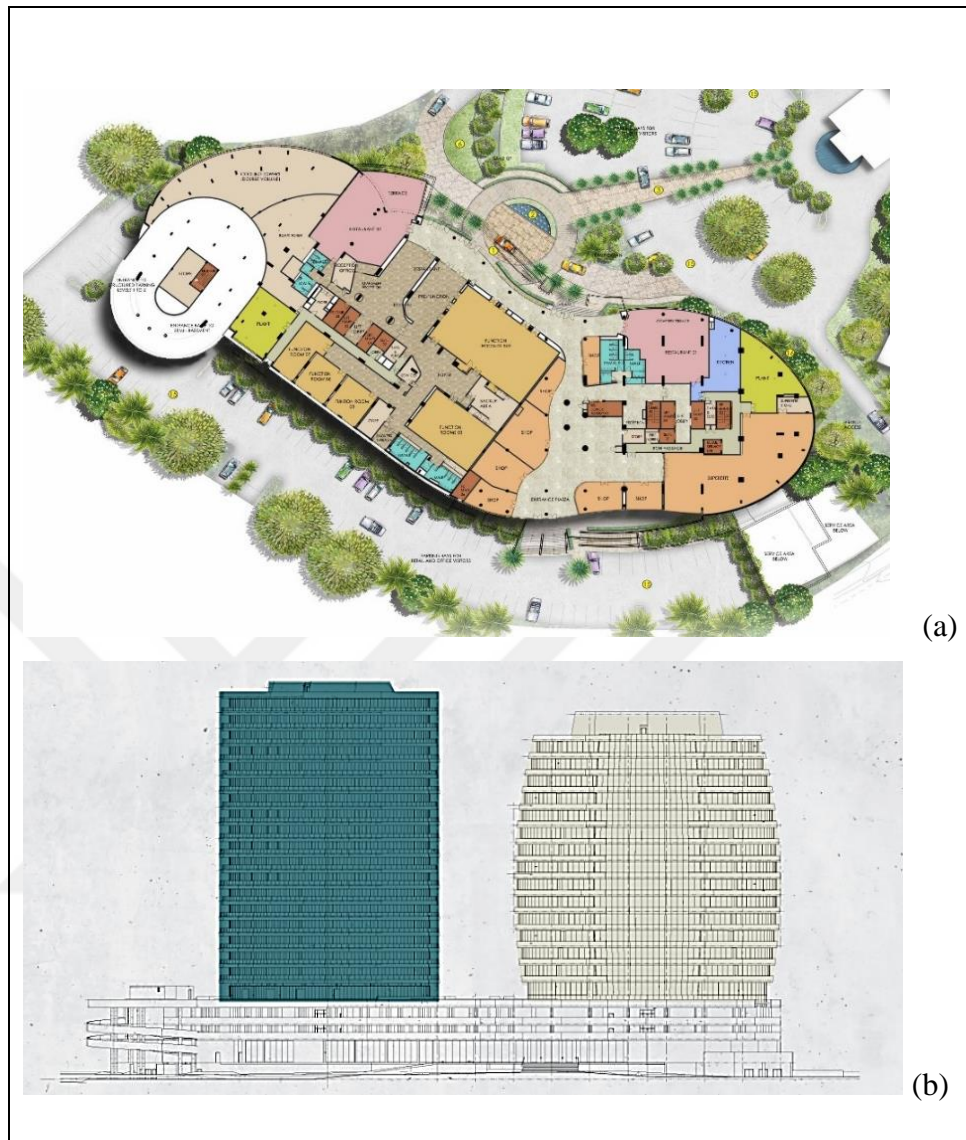


Figure 3.23. Torres Rani Towers (a) Ground plan (b) Longitudinale section [129]

Ana Comoana the ministry of culture and tourism of Mozambique while giving a speech about the evolution of the touristic affairs said the country was witnessing a new architectural cycle and mentioned the Torres Rani as an example to follow for the attractivity of the cities. [130].



Figure 3.24. Torres Rani Towers (a, b) Sky view (b) Apartment Lobby [129]

In two different register, the Kigali Heights and the Torres Rani Towers are good ambassadors of mixed-use typology. Compact by their size and the ratio of the usage they are mixing; our case studies are proof that mixed-use building can be a good choice for urban life improvement in underdeveloped countries. From the general idea of development, it is easy to understand that underdeveloped countries need to carve strategically their own path to step up the general socio-economic blossoming inside their respective borders. Socially, economically, environmentally, all the layers of the everyday life should evolve as a solid system were correlation and balance are the keys. Thus, introducing system and elements that have made their proof elsewhere can be a good idea if the ins and outs are well managed. Mixed-use building development can then be a good asset for the architectural ecosystem of underdeveloped countries, if the known challenges are well analyzed. It should not be use as a fancy trend; but as a necessity in their development and the expected impact.




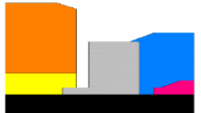










### 3.4. EVALUATIONS

In sum, many factors are at the base of mixed-use development proliferation all around the world. The reasons might be quite different from a country to another, but the study have tried to regroup them by countries classification. This approach is base on the allegation that development is not a set path that every country can follow. But if it is seen as a grade or a rate, then countries can be put on certain bearing and compare one to another independently of their development system.

After the different case studies, outcome makes mixed-use building a multidimensional solution depending on the development conditions. When it seems to be a necessary solution in some countries, it is just an alternative in others. It's closer to an anticipation solution in others case and even a totally new enhancement way for quality of life and services. In any case the last years have seen an increase interest for mixed-use development in retail, residential, office or retails development. It appears in the case of underdeveloped countries that mixed-use building is an attractive solution in front of the lack of infrastructures and constitutes furthermore a limitation of risk with the mix of use. If well introduced and spread as the examples sus-cited, mixed-use building development model could be the best alternative for African development as said Paul Onwuanibe, CEO of Landmark Group Africa. In developed and developing countries where it is more known, mixed-use building typology already have made is proof. It is facing different challenges nowadays. As it has been said, it is more in the building identity that the problem is rather than in the typology. Location, size, correlation and accessibility, all those specifications that refer to the building itself are the real challenges for mixed-use building development in those countries.

The following table is a summary about cited building in the study. The different information it provides permit to explore the large possibilities about mixed-use building. By juxtaposing buildings correlation can easily be maid from one to another without being obliged to compare them. The table is not a classifying or comparative one, it is an information gathering one as the mixed-use building topic has been cross long and wide.

Table 3.1. Summary Table

COUNTRY CLASSIFICATION (HDI)	COUNTRY	LOCATION	BUILDING NAME	MIXED-USE TYPE	ARCHITECT	ARCHITECTURAL SPECIFICATIONS	METRIC VALUES	COST (\$ USD)	PROJECT AIM	MUD'S EVALUATIONS		USAGE SEPARATION	
										Benefits	Challenges	Plan	Elevation
DEVELOPED COUNTRIES	France	80 Place de Clichy, 75017 Paris, France	MONTS ET MERVEILLES	Residential / Commercial	JEAN BOCABEILLE ARCHITECTS	Adaptive reuse, renewable energy, greenhouse gas emissions, solar energy, rainwater reuse cycling	12.000 m2 site / 129 nursery bed / 86 apt. / 46 social housing	\$25 M	Reuse of an train station and to create affordable housing solution. Be part of a mixed-use development project, oriented by energy and environmental smart solution	Social impact / Environmental friendly / Affordable pricing / Diversity / Originality	scale / flexibility for reuse		
	England	248 Ferndale Rd, Brixton, London, United Kingdom	THE DEPARTMENT STORE	Office / Commercial	SQUIRE & PARTERNS	Rehabilitation project, adaptive reuse, inner patio	6.200 m2 / 6 levels / 111 years old	NOT DISCLOSED	Refurbishment and reuse of an emblématique building to create unique place with sense of history and modernity	Size / Density / Conservation / Flexibility	Affordability		
DEVELOPING COUNTRIES	Angola	14th April Street, Lubango, Angola	LUBANGO CENTER	Residential / Office	PROMONTORIO	Brick and glass facades, low maintenance, natural ventilation enhancement technique,	570 m2 site / 7300 m2 gross area / 9 levels	\$9,5 M	Conciliate traditional and modern to enhance quality of life at affordable pricing	scale / flexibility / maintenance / low consumption / cultural impact	Access to public transportation / Management / Affordability		
	Iran	Tehran Province, Tehran, Movahhed Danesh, Iran	AVA CENTER	Commercial / Retail	FLUID MOTION ARCHITECTS	Infinity loop floor plan, 2 huge atrium, deconstructivist pillars frame system	6.000 m2 / 31.000 m2 gross area / 16 levels / 400 parking slots	NOT DISCLOSED	Solve a parking problem and create commercial value in a dense area	Social solution / Design	Access to public transportation / Affordability		
UNDERDEVELOPED COUNTRIES	Rwanda	KG 7 Ave, Kigali, Rwanda	KIGALI HEIGHTS	Office / Retail	VAVAKI ARCHITECTS	Glazed facades, eco friendly feature, in-house sewerage treatment, moduable floor plan	18.000 m2 site / 300 parking slot / 10 storey	\$40 M	Produce world class space while using new technologie to enhance quality of life and create commercial value in a dense area	Diversity / Social hub	Access by public transport / Affordability		
	Mozambique	Av. da Marginal, Maputo, Mozambique	TORRES RANI TOWERS	Residential / Office	DSA ARCHITECTS INTERNATIONAL	Energy efficient building, solar glazing and precast concrete façade, panoramic sea view, duplex penthouse	70.000 m2 gross area / 18 and 14 sotery tower / 180 apt. / 224.000 m2 office area	NOT DISCLOSED	Enhance quality of life and create commercial value to value a waterfront bay	Diversity / Social hub / Design / Management	Access by public transport / Affordability		

#### 4. INTRODUCING IVORY COAST

The Republic of Côte d'Ivoire from its official name; Ivory Coast is a west African country. Located on the south coast, the country lies on the Gulf of Guinea littoral, it is bordered by Ghana to the east, Liberia and Guinea on the west side and Burkina Faso and Mali at the north. The capital city is Yamoussoukro and the most developed and biggest city is Abidjan. Despite a decade of political troubles in the early 2000, Ivory Coast has been an economic powerhouse in sub-region of West Africa since its independence of France in 1960 [127].



Figure 4.1. Maps (a) Map of Africa (b) Map of Ivory Coast [132]

The country official language is French, but there are more than 60 local languages with 4 dominant ones. This very diversify population is the proof that the country is a cosmopolitan one. With a population of 26.000.000 in 2018, the country has an immigration estimated by the United Nations to 2.200.000 people in 2017. But recent consensus of population and housing advocate immigration up to 24 percent of the population against the UN number of 10 percent [133]. This growing immigration is fact to the rich soil and undersoil of the country. In fact, the country economy is strongly based on agriculture and related activities, which engage roughly two-thirds of the population. People from neighbor countries come there to found job in the plantation of cocoa and coffee. Ivory Coast is the world's first producer and exporter of cocoa beans, fifth producer and exporter of coffee and significantly placed on palm oil production. But as the country doesn't have the industries to transform on place, the economy is highly sensitive to international prices fluctuation [134]. Also, as many undeveloped countries, geopolitical climate is playing a lot on the economy and the inner politic reflect it on social atmosphere. Thus, country is poor but local elite are very rich and the big majority remain poor and settled in rural area.

However, the principal city Abidjan is a real hub and one of the densest cities in Africa. With a surface of 422 km<sup>2</sup>, Abidjan counts 5.1 million of habitant in 2017. It is the 2nd biggest francophone city in the world after Kinshasa, before Paris and the 7th most populated city of Africa. In West Africa, only Lagos count more population but is much bigger than Abidjan. With almost 20 percent of the national population on his land, Abidjan is generated 60 percent of the gross domestic product [135]. Everything is to be made or precisely, remade in term of infrastructures, because of the exponential growth of the population. That why the city is currently a gigantic construction site. As said before, underdeveloped countries are in general not unlivable as their definition may present them. Many considerations go to services quality but also socio-political blossoming. Abidjan is a real metropol with architectural landmark and a very dense urbanisation. The most know district is the lung of the city and called the Plateau. The plateau is the center of economics activities, house of numerous administrative building as bank, hotel, city hall and prime minister. This affairs district is worthy the reputation of the country as power horse of West Africa.

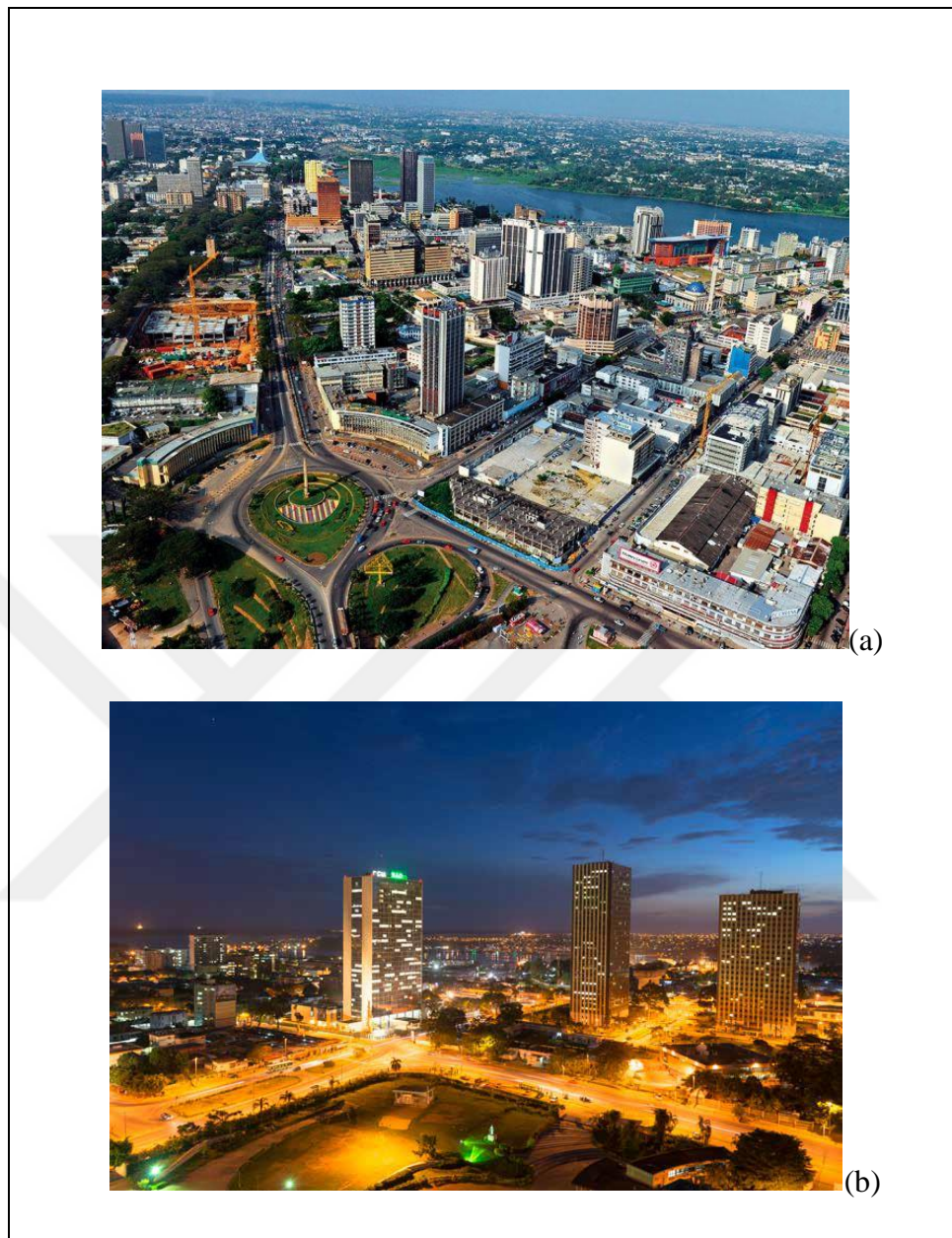


Figure 4.2. The Plateau. (a-b) Different views of Plateau [136]

Thus, portrayed the scenery, the study will try to focus on the architectural index that can permit the development of mixed-use concept. How mixed-use building introduction can help the proper urbanization of the city? What are the required for mixed-use building to be successful in the city of Abidjan? What is the existing or the close examples that can be assimilated to mixed-use building and what was their impact?

Here are the questions the study will try to elucidate by exploring the challenges before the possible impacts of mixed-use building development in the city of Abidjan

#### 4.1. POSSIBLE CHALLENGES OF MIXED-USE BUILDINGS

Mixed-use buildings challenges are existent and well known; and as mentioned before, mixed-used building as a typology is desirable for every country, but how can it be beneficial and what challenge it bring is a specific topic for each country's context. Generally revised in the chapter two in this study and minorly approached during the case studies, it's time to singularize them to Abidjan as it is the final purpose.

At first glance, it is important to note that like in many cities driven by capitalism and globalization effect, Abidjan built environment and building identity have dramatically changed. Shopping mall, housing development, dedicated office neighborhood, every typology and usage standing one in front another without real correlation. This freedom of choice causing inflation of rents in business neighborhood and making office in residential neighborhood undesirable. Mixed-use building development might council those singularity, but will it be accepted easily? [137]. As building is destined to users, it is important to know which mix of building they can easily adhere to. Along with the location and the scale that more refer to a defined building, identity issues and the preservation of local architectural heritage can be a major challenge to face while introducing mixed-use building typology. Studies need to be conducted to understand it and figure out the driving force by what mixed-use typology should enter the architectural environment.

As mentioned before, along with the identity problem that belongs to the mixed-use building typology, there is the scale problem. In fact, many underdeveloped countries have starting to show interest to mixed-use as urban development scale. Kenya, Rwanda and closer countries as Ghana and Nigeria by impulsion of their respective government have opened the doors to private investors for large scaled mixed-use development. Complete neighborhood, those developments include retail, residential, office, hotel and even administrative space. For example, the River Run project in Nairobi suburban (Kenya), have been launched to provide 1400 medium and high standing housing unit including low-rise apartment and villas. This master plan will be developed on 4Ha (405.000 m<sup>2</sup>) and will cost over \$150 million. This land was formerly a coffee farm, which is one of the main agricultural resources of the country [138]. The scale problem of the project is here obvious; the private investor who is looking for fluctuation of his investment will require a

well-situated land (in the capital city of the accessible suburban). This request should be a problem because life and vital activities are very concentrated in the capital city in the underdeveloped countries. Concede such land will probably affect the social layer in a way or other. In fact, these kinds of development are mainly based on economic aspect at the expense of the social. Of course, the development will bring social and public amenities but for only those who can afford it. Such choice will increase the social inequality between, on one side the expatriate, powerful autochthone class and on the other side the rest of the population who represent the majority.

If the scope of this thesis is to stick to the architectural side of the mixed-use typology, it still important to look at the effect that the introduction of such typology can create and took it as an awareness to avoid situation that already strike elsewhere else. Especially in those countries where the social blossoming and the inequality are very low it is important to anticipate such challenges and Ivory Coast is not an exception. The recent political event of 2012 which has split the country socially is still fresh and the ongoing reconciliation campaign is a proof.

Called “the lagoon pearl” because of the lagoon sleepers, the numerous water banks and the lake, Abidjan want to find back his proud face from the 1980 that it lost with political troubles this past decades. For that, massive construction sites are flourishing from every where in the metropole and the “numbers” (cost) too. After the 3rd bridge with toll access that have create tumults, it is about 15 new projects that are announced inside the city and 5 others on different suburban. The biggest ones with an undisclosed amount are the urban train which should transport almost 560.000 people daily and the Bay of Cocody attributed to a Moroccan investor. This last project consists on a luxurious waterfront mixed-use development with private boat dock (a Marina), restaurants, lounge and residence. The Vinci Project at the earth of the Plateau, consisting on 3 towers building including a 5star hotel costing \$150 million. Another bridge with a highway to disenclave a popular area for \$250 million. Tree different road interchange for \$35 million one. A 60.000 seat football stadium in the suburban of Ebimpe (40km from Abidjan), an aero city, and numerous roundabouts. Among all this project only \$2.5 million attribute for trees and park plant within the city and one African Rebirth Library in a mixed-use building of 14 story for \$85 million [139]. Underdeveloped and “poor” country, Ivory Coast his launching all those

construction by loan and private investment. 2 to \$4.5 billion credit opened only with china [140].

Both environmentally and economically this wave of construction is not sustainable. Mixed-use building introduction need to be introduced at controlled scale to reduce investment and all the risk that come with. Also concerning the large-scale development critics have been advocating highly negative impacts on the environment. According to the latest IPCC report, the built environment consumption in energy and its global carbon emissions is among the highest industry in the world [141]. And this is mainly due to the fact that constructions that are getting bigger and higher.

History has explained and gave proof about every holding and outs of mixed-use building. The concept is not necessarily new for underdeveloped country as Ivory Coast, but the contemporary version of this typology is new to embrace. Developers must be aware of the different challenges of the introduction of such a powerful typology at this era where globalization effect still strong. If the present give many reasons to introduce mixed-use building in the Ivorian architectural environment, it is important to masteries the typology and make it gradually take the place that should be necessary in order to prevent the future. Studies must be conduct on place to evaluate risk on the identity and the social layers. Scale control and management of the buildings are the keys, but also location and the important matter of transportation. Many solutions must follow the typology insertion in order to value the typology and get advantage of all his positive impacts.

#### **4.2. POSSIBLE IMPACTS OF MIXED-USE BUILDINGS**

If the development pit if large between the different country classification groups (developed, developing, underdeveloped) some problems are inherent to all the big cities. Even if the reasons are different from a group to another the findings are similar. Traffic jam, crowdedness, pollution, high rent and many others are the symptoms of urban life in big cities. In the case of underdeveloped countries and their big cities the reasons are known, lacks of infrastructure, scarcity of land, urban planning not respected and low civism. Among the research of solution mixed-use building is cited for all the benefits granted elsewhere [142]. Urban renewal for some countries, urban village for other, mixed-used development seems to be one of the preferred schemes for underdeveloped countries.



This study stands for another approach. In fact, to avoid bias and manages the known risks, mixed-use as a building typology is more likely to create better impact than mixed-use as a development for a middle and long term. The idea of mixed-use building is to bring people closer to the each other, then closer to their work and finally provide a secure and pleasant environment [137]. As underlined before, MUD creates a complete neighborhood which will be driven by economic return and occasioned many difficulties; instead mixed-use building represents less investment and a better management of social distortion. Recreating the live, work, play triangle in different neighborhood with a social value as a park or a public place will reinforce social cohesion and facilitate security management. This introduction of different hub is not aiming to create separate zone for different social classes. This approach aims to make people familiarize with the typology and get used to. The idea is to develop mixed-use building for different income group according to their zone to create social hubs and push the authorities to boost this socialization process.

Walkability is one of the keys for a successful mixed-use building. When people can afford a housing complex, they still want to enjoy the experience of a well designed and manage place. For example, the most common public space typology in the city of Abidjan is shopping mall. Four shopping malls of international standard have been raised up in less than five years in the capital city. In total 8 shopping malls in addition with some cinemas are the trends in Abidjan [142]. Veritable social hub those shopping mall present today very few renewability features. What if the trend passes? What if a better shopping mall is constructed nearby? By mixing the uses, a building multiplies the chance to stay trendy. Better, mixed-use building ensures longevity and renewability in the use. Apartment can be turned into offices; modulable offices can be turn into retail space without including big investment.

Architecturally mixed-use building should not be a difficult element to introduce in the current scope of Abidjan. As the architecture of globalization, mixed-use buildings fit to the architectural environment of big cities. Destined to facilitate life most important activities, mixed-use building can dynamize and enhance quality of life in the Ivorian capital. Mixing uses facilitate the management of trash, in place sewage and permit to reduce energy consumption. In some cities the municipality have saved up to 38% on infrastructure costs while serving compact developments opposed to large-lot subdivisions.

Both tenants and non-user can get advantage of mixed-use buildings because of the proximity and the stream on the income it can provide [141].

In the quest of new solutions for the quick growth of the population and the lack of qualitative public service, underdeveloped countries such as Ivory Coast, the concept of mixed-use building development can be a good alternative to palliate the missing of underdevelopment. Socially and economically mixed-use buildings present many aspects that match the needs of those countries. The growing middle class of those countries are also a good target that can easily dare to this new concept. If the risk and the challenges are well managed at the implementation, good result will quickly been observed.



## 5. CONCLUSION

From the early civilization, mixing uses have been present in the human habits. By constraint or by need mixing use emanates from the basic needs of human being. Once as a settlement, the mix of uses were conditioned by primary activities and the habitat itself were not base on a room character. Daily life and activities were governed by proximity and density because walkability was the only way of mobility. This practice last 10 centuries long from the 5th to the 15th century, it was medieval era with the medieval village concept.

As the medieval village was growing, it enlarges itself as larger settlement and this growth gave birth to the first cities. Wider, stronger, the little settlement of wood gave place to stone construction with different purposes and developments. But even if the distance where longer and the population more numerous, the society were structured on the same configuration of the medieval village. It was so for many civilizations until the early 1900s and the advent of new mobility mode as trolley followed by automobile later. But before this new era from the 14th century until the 17th approximately was the time of great discovery. The time when religion and the human grandiosity were taking the lead and architecture as the mirror of society followed and the configuration changed. Proper dedication of places, room-based construction, and great planification... the modern time roots was planted. It was the Renaissance time. Architecture became art and the construction of the time was oriented by grandiosity and the magnificence of God and the human itself. Mixed-use character lost sense as new construction technics emerges.

When the displacement and the construction technique in their evolution gave birth to technologies, it is the 18th century. More than 100 years later, the world faced with drastically changes. Human activities change of scale, the population growth is exponential, and technologies found adaptive solutions. The world is at the Industrial Revolution by this time. Manufacture changed into machinery, artisanal work evolves in factories, trolley is left for automobile and humankind can now travel very long distance on earth with the creation of the train. As machine are noisy, zoning born. Zoning is the opposite of mixed-use, it is a process that creates dedicated spaces for a designated activity. Mixed-use nearly disappear from the habits; it is obviously unnecessary and

caducous. The evolution was fast, cities enlarged their borders and people start moving from rural zone to the cities because all the activities are centered there. This movement is called urbanization in industrial era. The modern world is settled and mixed-use still have no sense to re-emerge.

But at the morn of the 20th century (1960 -1980) as the industrial revolution whole mechanism was getting old and the work got harder, critics start to complain about the system itself. New concept was advocated in contradiction with those of the industrial revolution. Community life, density, short blocks and urban revitalization was the new trend. New technologies based on a powerful process born following those events, communication and the informative technologies. With these new technologies, interaction and integration have no limit. From anywhere anybody could interact with other people, making economic flow fluent and allowing global exchange. Cultures, society, environment; this process called globalization; it affected every single activities of humankind. Globalization makes re-emerge mixed-use, firstly at small scale and as a building typology before it starts growing until it reaches the stage of urban development.

What is known today as mixed-use typology was included to the architectural literature in the beginning of the 21st century. The idea according to which a building when blending two or more uses, vertically or horizontally stand alone is called mixed-use building. Later some concepts such as "live, work and play" at the same place come to consolidate the typology making nowadays mixed-use building a strong and highly popular building type.

If mixed-use building has many benefits socially, economically and environmentally it also has strong challenges that come with. The benefits and the challenges relating to the typology vary according to the context it belongs to and the purpose of the building.

By using country classification based on HDI this study tried to regroup countries by socio-economic context in order to facilitate comprehension and rely on case studies to finish with consistent conclusion. This study advocates that mixed-use building can have positive impacts on social, economic and environmental life in underdeveloped countries despite the multiples challenges that came along with it.

The case studies of mixed-use buildings in developed countries outcome for mixed-use building preferred for renewal, revitalization, taking advantages of land, enhancement of standard, introduction of new transportation mode, integration of new technologies and

environment friendly construction. If in those countries mixed-use building developments are well expressed on all their benefits, the challenges are bigger. The examples of the Monts et Merveilles (Paris, France) and The Department Store (London, England) gave a similar picture. The first cited is the perfect contrast of benefits and challenges of the typology. Environmentally friendly, blending two different types of housing plus some retail space and a religious center, the building proposes many other features that make it a good example. But a complex of this level includes a scale problem which is a very sensitive challenge in big cities and second problem is the investment that all the technology features need. Also, this size of building is generally difficult to reuse. The Department Store for its case has no scale problem, it also has the flexibility as an advantage. The scalability of his plan and the conservation of most of the original aspect and the parquet add an historical and preservation value. But this kind of refurbishment has a cost. The shops and offices it offers are expensive. His location at the edge of the Brixton district makes the building a difficult access. In conclusion, mixed-use building in developed countries is a choice among others as it doesn't really bring new solutions and can be considered as antisocial in some case because of the city life it recreates inside his wall. Some professional support that mixed-use building development will be more beneficial for rural life rather than urban life

The case study of mixed-use building in developing country results for the typology as a solution provider for a precise need and as an enhancer of quality of life. In both the buildings examined the building purpose emanates from a problematic solution and the second use comes for a commercial value and an upgrade of living standard. If the Lubango Center (Lubango, Angola) and the Ava Center (Tehran, Iran) are successful in the solution they bring, they are both facing the same challenge. Affordability is the biggest problem of these two buildings. The offices and apartments of the Lubango center are expensive and obviously destined to the high class of Angola's population. Same finding in the Ava Center case where the shopping mall presents almost only luxurious brands.

The case study of mixed-use building in underdeveloped country has close results to the ones of developing countries, but for different reasons. In developing countries, the needs refer to a defined area, generally a neighborhood or a district. But in underdeveloped countries the needs are bigger and the demand of mixed-use building comes for economic purposes (so wider range of population targeted) and because of the lack of infrastructure.

Also, if examples exist of mixed-use building can be found in some underdeveloped countries, the trend is more at mixed-use development. The Kigali Heights (Kigali, Rwanda) located in the new neighborhood of Kimihurura is difficult to access in a country where public transportation and services is low. The Torres Rani Towers is facing the same public access problem. Both building located in upscale neighborhood are perceived as "fancy" places.

In definitive, the hypothesis of the thesis: if mixed-use building typology is necessary and helpful for some societies and their built environments, it can also be substantial for Ivory Coast case, is verified.

Even if many conditions need to be brought together, the challenges are known in mixed-use building development. With good pre-analysis of the ideal mix of use, the different area of impacts, the scale and risk control, mixed-use building can match the purpose of this thesis. Also, If the introduction scheme is followed as the history of the re-emergence of the typology demonstrate, starting with small scales before going bigger, mixed-use building will have positive impacts in Ivory Coast.

This can make mixed-use building a sustainable alternative for Ivory Coast and maybe other underdeveloped countries.

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