İSTANBUL TECHNICAL UNIVERSITY ★ INSTITUTE OF SCIENCE AND TECHNOLOGY

THE ASSEMBLAGE OF HIGH-RISE INTO THE URBAN ECOSYSTEM AS A UTOPIAN PROPOSAL

M.Sc. Thesis by
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Department : Architecture

Programme : Architectural Design

JANUARY 2010

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İSTANBUL TEKNİK ÜNİVERSİTESİ ★ FEN BİLİMLERİ ENSTİTÜSÜ

YÜKSEK BİNALARIN ÜTOPİK BİR ÖNERİ OLARAK KENTSEL EKOSİSTEME ENTEGRASYONU

YÜKSEK LİSANS TEZİ
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FOREWORD

I would like to express my deep appreciations for my supervisor, Dr. Çiğdem Eren, who in the first place helped me to acquire whole new perspectives to high-rise buildings, to all of my professors who encouraged me to proceed further and deeper all through my educational life, to my grandmother who had given me the infinite will and eagerness for reading, researching and learning ever since my very first days on the Earth, and finally, to Engin N. Maçoro, my dearest ally and friend for life who has been my greatest advisor and guide, and without whose love and support I would not be able to even start this journey.

February 2010   Berrak Yapıcı

                                                              Architect

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SUMMARY

In this thesis, the notion of 'high-rise' has been considered extensively referring to its theoretical background in order to comprehend the factors affecting and orienting the development of contemporary high-rise architecture. As a notion closely associated with the developmental phases of the civilization, it has been chosen to approach high-rise buildings not only as the achievement of certain technological ends, but as a dynamic combination of multiple factors which are in continuous interaction, and which have led to the emergence of various tall building typologies all through history. In the beginning of the research, it has been gone through the definitions of high-rise in order to achieve a general understanding of the notion; consequently, the metamorphosis that tall buildings were undergone has been considered particularly in terms of the symbolic and functional values they have borne. High-rise has then been associated with utopias since utopian features were considered to be intrinsically present in tall buildings, and furthermore, because utopia has been thought to act as a factor revealing unknown or inexperienced potentialities of high-rise. Subsequently, the conceptualization of high-rise which would act as a vertical urban ecosystem proposition rather than being only a singular and autonomous building type has been further discussed both in terms of the symbolic and functional values, and the utopian potential of tall buildings. In the last chapter, in the light of the issues discussed in the thesis, it has been focused on the design of a new generation of tall buildings as an adaptation and realization of utopian thought in the context of the twenty-first century.

YÜKSEK BİNALARIN ÜTOPİK BİR ÖNERİ OLARAK KENTSEL EKOSİSTEME ENTEGRASYONU

ÖZET

Bu tezde, 'yüksek bina' kavramı, çağdaş yüksek yapı mimarisinin gelişim sürecini etkileyen ve yönlendiren etkenleri derinlemesine anlayabilmek amacıyla kavramın teorik altyapısına da değinilerek incelenmiştir. Medeniyetin gelişim aşamalarıyla yakından ilişkili olan yüksek binaların, yalnızca belli bir takım teknolojik hedeflerin aşılması olarak değil, sürekli olarak etkileşim halinde bulunan ve tarih boyunca çeşitli yüksek bina tipolojilerinin ortaya çıkmasına sebep olmuş birçok etkenin dinamik bir kombinasyonu olarak ele alınmasının uygun olduğu düşünülmüştür. Araştırmanın başında, yüksek bina kavramı ile ilgili genel bir fikir edinebilmek ve kavramı daha iyi anlayabilmek amacıyla çeşitli tanımlar üzerinde durulmuş, ardından da yüksek binaların geçirdiği metamorfoz, taşıdıkları sembolik ve işlevsel değerler bağlamında tartışılmıştır. Bunu takiben, yüksek binalar, hem içsel olarak ütopik özellikler taşıdıkları düşünüldüğü için, hem de ütopya yüksek binaların bilinmeyen ya da daha önce deneyimlenmemiş potansiyellerini ortaya çıkaran bir etken olarak değerlendirildiği için, ütopyalarla ilişkilendirilmiştir. Bu bağlamda, yüksek binaların sahip oldukları sembolik ve işlevsel değerler ile ütopik potansiyelleri de göz önünde bulundurularak, tekil ve otonom bir bina tipolojisi teşkil etmek yerine düşey bir kentsel ekosistem oluşturabilecek bir yüksek bina kavramı üzerinde detaylı olarak durulmuştur. Sonuç bölümünde ise, tez boyunca tartışılmış olan konular doğrultusunda, 21. yüzyıl bağlamında ütopik düşüncenin bir adaptasyonu ve tezahürü olarak ele alınan yeni bir yüksek bina jenerasyonunun tasarımı üzerine odaklanılmıştır.

1. INTRODUCTION

1.1 Aim and Content of the Thesis

Even though high-rise has always existed in many cultures and traditions, it has gained further importance and has become an inseparable part of the metropolises beginning from the end of the nineteenth century. It has also been realized that tall buildings are likely to continue their existence since they are capable of offering acceptable solutions to certain problems big cities are facing. In the beginning of the research it was seen that the studies about high-rise in Turkey were mostly based on its engineering and management aspects, where only a few were present about its theoretical background. Therefore, to fulfill the exigency of understanding the theoretical bases on which tall buildings are grounded and to reveal its potentialities, it has been decided to research and discuss the concept in an extensive manner.

In this study, the approach to high-rise does not only involve skyscrapers as a building typology, but also other tall building types which have existed almost from the beginning of civilization. Thus, high-rise is considered as a notion closely associated with the developmental phases of the civilization, working almost as an indicator of them. In these terms, it has been chosen to approach high-rise not merely as the achievement of certain technological goals, but as a dynamic combination of multiple factors in continuous interaction which have led to the emergence of diverse tall building typologies all through history, and which are currently giving rise to a new generation high-rise at the onset of the twenty-first century.

In the beginning of the research, it has been decided to go through the definitions of the terms high-rise and skyscraper in order to achieve a general understanding of these notions. Consequently, referring to different high-rise building examples in a timeline ranging from their earlier periods to the end of the twentieth century has been beneficial in comprehending their development process and the factors causing particular changes in the way high-rise was conceptualized. Hence, the metamorphosis that tall buildings were undergone was considered especially in terms of the symbolic and functional values they have borne, since it would turn out to be useful in questioning and understanding the changes the nineteenth century

high-rise, or namely the skyscraper, has gone through in the twentieth century to finally yield a new conceptualization of high-rise which would act as an urban proposition rather than being only a singular and autonomous building typology.

Consequently, high-rise was associated with utopias since utopian features were considered to be intrinsically present in tall buildings as a 'raison d'être' in relation to the symbolic and functional values of high-rise, and furthermore, because utopia might act as a factor revealing the unknown or inexperienced potentialities of building tall, contributing to the emergence of a new understanding of high-rise which bears close resemblances to utopias by constituting self-sufficient systems that promise better or ideal living environments that also seem to be 'impossible-to-build' in technological terms. Utopia, therefore, was approached as a constitutional link between the very concept of high-rise and the new generation high-rise which emerges out of it as a natural result of ongoing developments in various fields ranging from technology to economy, politics, ecology, etc. As a result, utopian thought was investigated since it is thought to trigger the evolution of tall buildings, and its possible contributions to the metamorphosis of the concept of high-rise were questioned.

While researching the emergence, development and metamorphosis of tall buildings, it has been considered that their utopian traits have brought about new perceptions of high-rise which combine in a holistic manner various aspects of architectural design with everyday urban life, leading to the emergence of a new generation of tall buildings which are supposed to act differently from the ordinary singular high-rise, functioning as integral parts of the urban realm. Therefore, high-rise as a vertical urban ecosystem proposal was further questioned, referring to the definition of the city as an ecosystem, and to the previous changes in the conceptualization of tall buildings which were due to the involvement of multiple factors throughout the developmental stages of the civilization. Lastly, it was achieved that a new generation of high-rise which is beyond being a singular building typology, could hold potentialities that would contribute to the formulation of successfully working urban environments in the context of the metropolises of the twenty-first century.

1.2 Methods of the Research and Forming the Structure of the Thesis

As mentioned in 1.1 Aim and Content of the Thesis, the research does not only involve high-rise buildings in technical terms, but aims to include multiple issues in order to comprehend the theoretical background of the human will to build tall. For

this reason, the method of the research mostly involves crossreadings to investigate the concept of high-rise in detail, associating different perspectives and ideas from various disciplines in order to achieve a holistic point of view, and to possibly make room for the emergence and development of new ideas through the discovery of novel relationships and links between the issues discussed in the thesis.

The concept of high-rise therefore, has been decided to be considered in three steps:

In the second chapter, it has been planned to go through the dictionary and encyclopedic definitions of the terms 'high-rise' and 'skyscraper' in order to achieve a general understanding of these notions in the first place. Subsequently, the metamorphosis that the concept of high-rise has gone through is discussed in two steps, being the symbolic and functional values of tall buildings, which also involve the historical development phases of high-rise in order to question in a deeper sense how the theory of building tall has evolved and transformed gradually in a certain time period.

In the third chapter, utopia is firstly discussed both by referring to encyclopedic and dictionary definitions, and afterwards, to literary and architectural examples since these are the two major fields utopian thought has been able to ground its bases. Following that, it is investigated how utopian architecture has established a place in high-rise design, how this is related to the symbolic and functional values of tall buildings, and how it might affect future development of a new generation high-rise perception.

The forth chapter is mainly based on the assemblage of a new generation of tall buildings in the urban context as a vertical ecosystem. Therefore, the definitions of the notions such as ecology, ecosystem and urban ecosystem are firstly examined. Based on these, high-rise is then considered as an ecosystem proposal, and its integration into the city is further discussed. Consequently, as this is a complex issue comprising multi-layered factors, the impacts of the changes in the life styles on the design of high-rise, and their contributions to the emergence of a new generation of tall buildings as an assemblage of vertical urban ecosystems into the entirety of the urban context is investigated in detail, along with suggestions for healthier and successful living environments into the high-rise of the twenty-first century.

2. METAMORPHOSIS OF THE CONCEPT OF HIGH-RISE

Humanity has begun its quest for building tall as soon as the know-how of appropriate techniques was achieved. Within a relatively short period of time compared to the whole history of humanity, this quest was turned into one of building taller and taller. Thus, from the ancient temples, to the large and outstanding tall buildings of our times, high-rise has become an inseparable part of the cities, and consequently of human life at various levels.

The term 'high-rise' has been described in the Encyclopedia Britannica as:

> "Multistory building tall enough to require the use of a system of mechanical vertical transportation such as elevators" (Encyclopedia Britannica, 2009).

On the other hand, Merriam-Webster's Online Dictionary sorts out the term as an adjective standing for:

> "1. being multistory and equipped with elevators
>
> 2. of, relating or characterized by high-rise buildings" (Merriam-Webster's Online Dictionary, 2009).

The common point of these definitions is the fact that they both remark the presence or necessity of a mechanical system for vertical transportation such as the elevator. At this point, an important question arises: whether the pagodas, pyramids, ziggurats or gothic cathedrals were not high-rise buildings, or the only ones deserving the term or adjective 'high-rise' are the tall buildings constructed throughout the last 100-150 years. In fact, the common word with which high-rise buildings are used to be called since the turn of the twentieth century is 'skyscraper'. The word skyscraper is in turn defined as "a very tall building" (Merriam-Webster's Online Dictionary, 2009), or described as:

> "Very tall, multistoried building. The name first came into use during the 1880s, shortly after the first skyscrapers were built, in the United States. The development of skyscrapers came as a result of the coincidence of several technological and social developments. The term skyscraper originally applied to buildings of 10 to 20 stories, but by the late 20th century the term was used to describe high-rise of unusual height, generally greater than 40 or 50 stories" (Encyclopedia Britannica, 2009).

From Ken Yeang's point of view, skyscraper has again a definition referring to technological and constructional properties mostly. Yeang describes the skyscraper

as being fundamentally a multi-storey building, of which the main composition involves the use of high-speed elevators along with a structural frame, which add up to the combination of ordinary space similar to that of the lower buildings, with extraordinary height; again in geometrical means, the skyscraper can be seen as the built space being intensified on a small site in the first place (Yeang, 1994). On the other hand, Charles Jencks approaches of the definition of skyscraper as a complex and multi-sided issue. The definitions restricting the skyscraper to the simple function of commerce and business, or excluding the heaven-aspiring buildings of 3000 or more years ago, would basically be ignoring the skybuildings mankind has been constructing for quite a long time (Jencks, 1980).

Following these definitions, it would be appropriate to confirm that the mere word skyscraper may not always be sufficient to substitute 'high-rise' since the term high-rise comprises skyscraper, but is not limited to it. As a clarification of the issue, Altan Öke defines the buildings significantly taller than the surrounding ones, which have begun to be constructed in the USA at the end of the nineteenth century as skyscrapers, and mentions diverse translations of the word skyscraper in French and German, being respectively 'gratteciel' and 'wolkenkratzer'. For the meanings of these words are inconsistent with nature, the expressions 'high-rise building' and 'tall building' in English language and 'hochhaus' in German are being preferred as scientific and objective technical terms (Öke, 1993). To avoid the terminological confusion and reducing the content of the study to tall buildings of certain height or era, the term high-rise is going to be used extensively and preferably rather than the term skyscraper.

The issues how and why tall buildings have come into being, and again how and why different types have emerged will be discussed in this chapter along with the metamorphosis the concept of high-rise has undergone through its existence. The consideration and evaluation of the symbolic value of earlier tall buildings, the coming into prominence of the functional value and the constant shift of these two are going to be of primary concern throughout the chapter.

2.1 Symbolic Value

The history of high-rise goes back almost as far as the beginnings of the civilization. In fact, it could be said that the urge to build tall and/or big started quite a long time ago, if for instance, the great pyramids of Egypt, or the ones in South America which are found in relatively higher geographic locations and reached through sets of stairs probably in order to enhance the height, are to be considered. Amongst many

reasons for which tall buildings might have emerged, humanity's will to defeat natural forces such as the gravity, or the developments in technologies and techniques may be cited (Ciravoğlu, 2007). Examining the earliest examples of high-rise, it is most likely to be confirmed that they were first designed and dreamt of as structures serving religious purposes and indicating the power and will of God/gods. Myths and religious texts of the ancient times that reach our days are full of depictions of towers. Mesopotamia, Far East and Egypt are amongst important locations where the function of towers has been constituting stairways to God in the literal sense of the word; besides western culture is very familiar with the mythical story of the Tower of Babel as a symbol to both God's power over mankind and man's power over nature (Graham, 1988). As historical precedents of high-rise buildings, pagodas, steeples and obelisks are also of remarkable importance. They can be regarded as the most obvious precedents of heavenly-soaring building types, which emphasize the symbolic meaning of high-rise as generally the upper stories could not be reached and they functioned only as monuments marking a shrine or relic (Jencks, 1980). Considering that the impact of religious belief on societies might have been a lot greater in early ages, it could be easier to envision how the singular and monumental tall buildings of those times have worked as prominent symbols determining the direction of the values of the respective societies. The Parthenon on the Acropolis of ancient Athens was built to worship Athena, the patron goddess of the city; likewise, the Islamic minaret and the Christian cathedral bell tower were designed to orient people to God's call in the following ages, all functioning as symbols representing the most important institutions of their cultures (Kohn, 1991).

Figure 2.1 : Cheops Pyramid, Egypt

Figure 2.2 : Suzhou Pagoda, China
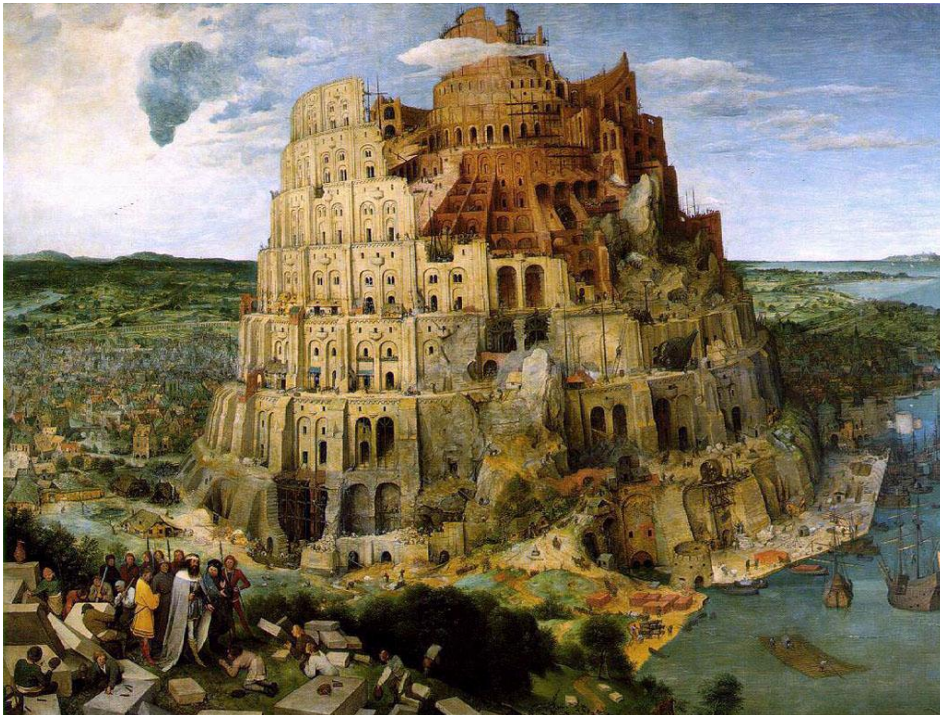
Figure 2.3 : Bruegel, 'Tower of Babel', 1563

Although the ancient predecessors of tall buildings such as pyramids, ziggurats, pagodas were of highly symbolic value of the belief system they had represented, it was not the mere function attributed to them; they were also large, spectacular monuments of which a certain amount survived until our times -for instance Egypt's Great Pyramids- and still are considered in the same manner and visited by big masses of people, along with subsequent tall buildings ranging from the Eiffel Tower to the Empire State Building. Still, it is quite likely that one important issue regarding the high-rise buildings as religious symbols has been underestimated, or shown little interest. As Doğan Hasol states, mankind's endless obsession of building higher had resulted in the pagodas of the Chinese, minarets of the Muslims, or the ziggurats of the Mesopotamians; these building types, despite the fact of being constructed to fulfill religious or symbolic ends, had not have a symbolic value of purely religious nature (Hasol, 2007). Interestingly, if the issue is further evaluated, a secondary purpose rises to the surface: the power and ability of the authority figures constructing them are to be represented through these tall buildings themselves. As a matter of fact, in feudal or religion based societies where the land was the primary economic source, the feudal lords and clergymen being in possession of the land in behalf of God wanted to declare their power and privileged status by means of cathedrals and churches reaching for the sky (Ökem, 2007). Indeed, this is a kind of subtext that lies just beneath the unwritten rule that the earlier high-rise buildings should serve as symbols for divinity, and it is quite often that the subtext supersedes the primary aim. Other obvious examples would be the 146 m high pyramid of Cheops, additionally and maybe principally symbolizing the power of pharaoh (Hasol, 2007), or the sultan in charge of distributing God's benefaction in Ottoman and Islamic cultures, attempting to concretize this divine power through religious buildings (Ökem, 2007).

Figure 2.4 : Ziggurat of Ur, 2100 B.C.
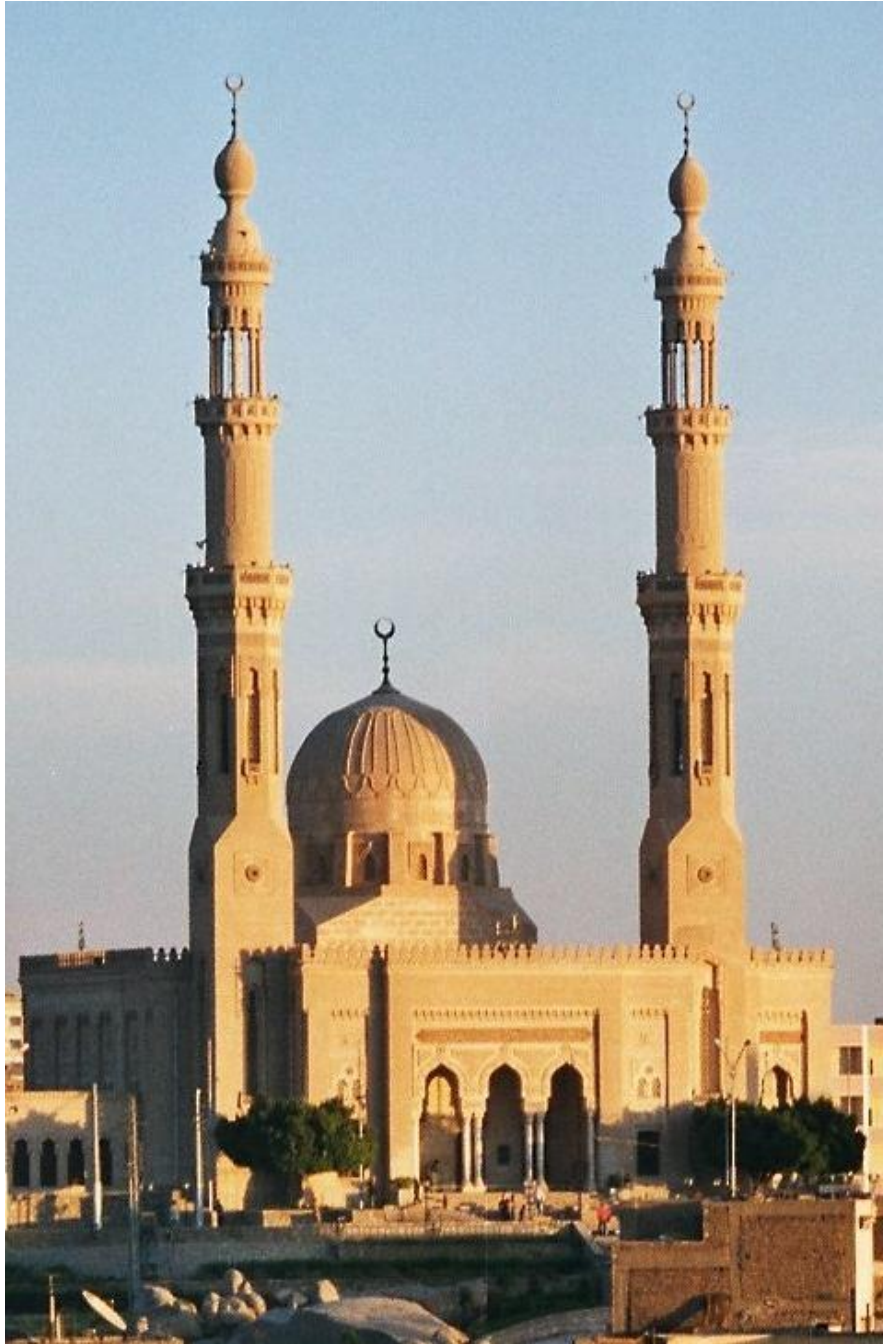
Figure 2.5 : Aswan Mosque, Egypt

Given the fact that the symbolic value of early high-rise building examples had very often shifted from the religious significance to the pointing out of the administrative and ruling authorities, it is possible to determine that the very same situation applies to many different kinds of tall buildings of varying eras and cultures: regardless of the primary purpose for which the building might have been built, the people or institutional figures providing for its construction stand out and underline their power on earth. With the beginning of the Middle Ages, the situation mentioned above started to manifest itself much more overtly. For instance, the towers of the medieval

Italian city San Gimignano had been constructed between the twelfth and fourteenth century by noblemen in order to demonstrate their family status and to stand for individual prestige (Graham, 1988). The higher or stronger the tower, the higher and stronger was the place of the family among many others also in metaphorical sense: a statement that might be regarded as the involvement of politics as a new value symbolized by high-rise, in terms of being a determining factor of the fundamental principles of a society. Still conserving a small amount of its towers dating back to the Middle Ages, San Gimignano constitutes an excellent example of aggregation of tall buildings in close proximity, making up some kind of a neighborhood or city on its own - an unprecedented fact that was not repeated until the rise of Manhattan's skyscrapers. Indeed, San Gimignano has been referred to as a skycity where many of the towers belonged to the strongest families and had no other obvious use but being defensive and symbolic; at that time, height as a tool of symbolism, or in other words, constructing the world's tallest building was indicating an explicit sign of power as it does now, and therefore the towers resulted much taller than it was needed for defensive purposes (Jencks, 1980).

Figure 2.6 : San Gimignano, Italy

The Gothic Age had coincided with the dates in which San Gimignano's towers were being built, but it was expanded to a wider period of time. It could be seen as a

period when the pursuit of height has begun to become an issue for which cities and nations competed. Gothic cathedrals, symbolizing the sublimity of Christian religion, were being built in a number of places ranging from the South to the North of Europe, ascending towards the sky in continuous competition with each other. In addition to their religious significance, they were now symbols and almost ornaments for their cities; 'proud and soaring things' as Louis Sullivan supplied for the twentieth century skyscrapers. Nonetheless, even though the architects of the Gothic Age had the knowledge of building as high as 157 m as in the Duomo di Milano, or 142 m as in the Strasbourg Cathedral, the techniques they used did not allow them to finish their work earlier than a few centuries, involving the workmanship of thousands of people through several generations – a fact that might have increased or enhanced the symbolic value of these cathedrals making them look like almost legendary towers. Chartres Cathedral, as one of these, was perceived as even a more magnificent building when its town could still be said to be a village, at about the same time, the great towers were rising above the farmlands in northern France as a celebration of civilization (Graham, 1988). The height was generally overemphasized to the limits in order to increase the sense of admiration and appreciation, and the public which mostly consisted of peasants and illiterate people was probably very easily impressed by this. Hence, the duty of these gothic buildings as symbols of religion and excellence was quite triumphantly carried out. Furthermore, besides being only earthly symbols for a spiritual and divine realm, and indicators of wealth and greatness of their hometowns, they could also said to be regarded as sacred and exalted objects, or monuments on their own, as accomplishments of human capability. Actually, the efforts of the architects of the Gothic Age were so extraordinary that they were occasionally overcoming themselves, sometimes resulting in dramatic events such as the collapse of the Beauvais Cathedral because of the exaggeration of its pointed arches to the point of losing their bearing property (Graham, 1988). Indeed, the great Gothic cathedrals are still appraised and evaluated as exquisite works of art and monuments.

As pointed out, high-rise buildings were mainly perceived as effective ways of humankind to express itself and its values by architectural means. While the earliest examples were closely associated with religion and adoration of God/gods, the subsequent objectives were to become symbols of status and power, and of families, cities, nations, clergy and noblemen. Given this condition, it would be adequate to affirm that the concept of tall building has functioned as a tool for communication and of declaration of people and institutions of their highness,

relative to the height and grandeur of the buildings they constructed. Therefore, the notion of high-rise has always been engaged with structures of power and authority since its dawn; and being a symbol has not meant to be devoid of a function, but rather having the symbolizing task as the primary function where in the great majority of the cases one or more prescribed functions were already present.

Figure 2.7 : Duomo di Milano, 1386-19th century

Figure 2.8 : Chartres Cathedral, 1194-1260

Figure 2.9 : Strasbourg Cathedral, 1015-1439

Another factor was introduced as a new issue to be symbolized through tall buildings by the emergence of the skyscrapers at the end of the nineteenth century. In fact, skyscrapers were not the cause, but the evident manifestation of this issue: after the industrial revolution, economy was appearing as the most prominent factor affecting world's nations, and skyscrapers were beginning their ascent in Chicago and New York City as the natural result of economic exigencies, which later were to turn into important elements affecting nations' economies at a great extent in a reciprocal relationship. Of course, the appearance of this novel building type was not only due to economic developments; although money was always crucial as the impulsive force in the coming into existence of the previous high-rise building types as mentioned earlier, a general change in the life style was prevailing simultaneously with striking advancements in technology at the turn of the twentieth century.

Until the end of the nineteenth century, buildings of large volumes which were used to provide for the requirements of religious, commercial, industrial or administrative institutions were ordinarily being constructed horizontally on big plots of land; the opportunity to grow vertically was achieved by the utilization of the elevator for the vertical circulation, by the technological advancements in ventilation and fire protection systems, and by the transition from masonry to framework construction (Eren, 2007). Newly developing construction systems supporting the use of new materials such as steel were of extreme importance in allowing the buildings grow

taller, yet this growth could only be favored by the introduction of inventions such as the elevator facilitating the life inside the building. Differently from the antecedent high-rise buildings, the notion of skyscraper was born in order to make room for a more intense and uninterrupted life cycle. This life cycle in turn, would eventually serve capitalist ends: the newly formed tower would act as the center of business and commerce; therefore it was of great significance to design these buildings as practical as possible. According to Jencks, a number of technical determinants had played important roles in the emergence of the nineteenth century skyscraper. The primary major innovations were in the systems such as the revolving entrance doors avoiding the ruining of a business venture because of strong air currents, vacuum incinerators and flush toilets providing the waste products to fall with gravity instead of rising into the air, all kinds of inventions in window joinery and wind bracing keeping people from fainting and the glass windows from bulging out since wind may cause tall buildings to sway, telephone which allows people on different floors to communicate properly, first platform freight elevator invented by Henry Waterman in 1850 and first hydraulic elevator with safety device by Elisha Graves Otis, and all other advanced technologies of ventilating, cleaning, and lighting. The secondary major innovations were the structural ones. By the 1870s masonry construction was mixed with cast iron in order to reduce the ground floor structure of high-rise buildings, followed quickly by cage construction and skeleton construction successively. By 1885, steel skeleton structure was introduced as a system providing both the characteristic grid look and 15% of saving on normal building costs, which later had found such a great acceptance that it was almost seen as the definer of the skyscraper (Jencks, 1980). Very similar reasons were also listed by Andres Lepik who pointed out that the economic catalyst was an important factor besides technical and structural ones; for instance, after the great fire of 1871, there was a rising demand of office space in Chicago, and since the land in the city center was very expensive and maximum usage was expected by investors, increasing the number of floors signified obtaining a higher return, which led to the rapid evolution of skyscrapers, combining new construction methods with financial pressures (Lepik, 2008). The age and race of corporations was thus beginning; and it was not only affected and oriented by the changing nature of the concept of work, but also by the high land values in the city centers. It was very likely to consider skyscrapers as reasonable consequences of economic forces (Ciravoğlu, 2007). Skyscrapers were to become a solution for capitalist purposes, enabling the gathering of numerous white collar workers in one single workplace, and allowing them to utilize the same working tools within a supervised and organized hierarchy (Hasol, 2007).

Figure 2.10 : Steel skeleton construction

As discussed above, though technical and economic developments were of determinative value in the formation of the nineteenth and twentieth century high-rise buildings, they could not said to be the sole generative force in their formation, but rather as agents serving to facilitate and enable this process. As a matter of fact, the ongoing economic progress at that time would have found one way or another to express itself architecturally, just as any other major development or event in the past had done. Not very surprisingly, skyscrapers were a very accurate fit to fulfill this purpose, considering the symbolic value tall buildings have always had. Kohn was referring to this situation as follows:

> "Although it may seem that the explosion of tall buildings across the skyline of 20th century cities
> is a function of rising land costs and technical innovation, man invents what he aspires to
> achieve as much as he invents what he needs. Man always had the desire to reach for the
> heavens and to build symbolic monuments. The economic necessity of tall buildings due to
> rising land costs was merely a catalyst in the proliferation of a building type which has persisted
> throughout history." (Kohn, 1991)

The Western world was going through the industrialization process in the nineteenth century, and tall buildings were becoming the expression of the age accordingly (Graham, 1988). Just as the church, state or king had the dominant role in the past in European and American cities, this role was now of the corporations to play; an obvious example to this condition being the 9/11 terrorist attack to two tall buildings housing the World Trade Center (Ciravoğlu, 2007). Actually, this attack was important for it remarked that the symbolic value of high-rise buildings was still very prominent at the beginning of the twenty-first century, and not only as a symbol for

economy. It was this catastrophic event that demonstrated how skyscraper constituted a repository for the essential values and beliefs of a culture, being a threat for those who did not believe in the same values (Lepik, 2008). Somewhat, this was a new conception of the high-rise building as a symbol for vulnerability, on the contrary to the defensive towers of the past which suggested unity and power. The event of highly symbolic nature could be compared to the destruction of the Tower of Babel, which pointed out the irreversible destruction of the unity and solidarity of human race in a metaphorical sense.

Figure 2.11 : Terrorist attack to the World Trade Center towers, 2001

The evolution of a new generation of high-rise buildings in the nineteenth century might have started due to technological and economic factors, and worked as a powerful indicator of both at the very beginning. Nevertheless, it was almost in no time that additional values were attributed to them in the natural course of events. The prevalence of tall business buildings in city centers was an emblem of corporations besides being a reaction to economic constraints (Kohn, 1991). On the other hand, these high-rise buildings were also the symbols of their cities. Tall buildings as skyscrapers were born in Chicago and on Manhattan Island in New York City in the last third of the nineteenth century, and evolved to become the symbol of these cities as a very successful American invention, spreading later to the whole country and whole world in turn, and having an active role in the creation of high density commercial centers which provided completely new architectural, engineering and planning concepts (Brubaker, 1988). The Tower of Babel, the ancient temple, the Gothic Cathedral, and the tower of noblemen's dignity was now transmuting into something new that sheltered a little bit of all at the same time, blended with new ideas. All through the twentieth century, skyscrapers were the

symbols of successful business, wealth, worldwide known corporations and their hometowns, as the pride of their architects and countries. In fact, the monumental quality that any other kind of high-rise building held was also valid for this new building type; however, it was still not necessary to be a skyscraper in order to be respected by people as monuments and serve symbolic ends at about the same period of time. Not being a member of this category of tall buildings, the Eiffel Tower was an excellent example having symbolic value. It was built during the great exposition of Paris despite violent objections, and over time was turned into the symbol of Paris and France; besides being the symbol of a country, it was also symbolizing a great degree of human achievement (Graham, 1988).
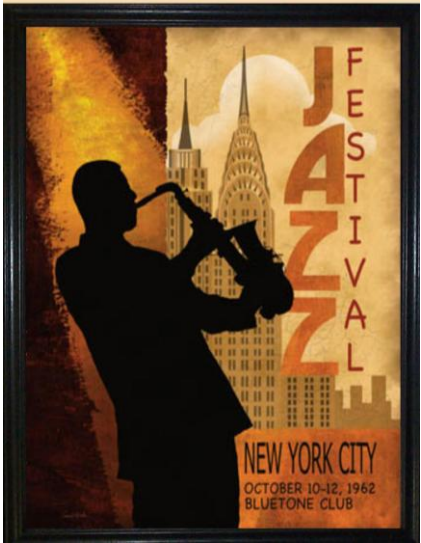
Figure 2.12 : Skyscrapers as the symbol of New York City in an advertisement

Figure 2.13 : Eiffel Tower as the symbol of Paris in an advertisement

Within a quite short period of time, the notion of skyscraper as a new generation high-rise building was recognized as a worldwide known phenomenon of remarkable reputation. It was desirable for countries to have their own skyscrapers in order to prove their importance and to get a prominent place among the world's greatest nations. Skyscraper was surely of no lesser weight in being a tool for the symbolization of power and status than its historical precedents. Throughout the twentieth century, it was observable that in spite of being originated in the USA, skyscraper had had the capacity to act as an entity representing particular nations and regions in a variety of places and countries; it was becoming a signature building, and apparently, an increasing number of countries were in possession of necessary means to take part in the symbolic race for the highest by the end of the century, due to the triumph of the capitalist economic system in spreading throughout the world (Lepik, 2008). Indeed, in a world where the values of the capitalist economy were accepted almost as rules, it was indispensable for a country to have at least one or two cities with glorious skyscrapers in their centers or periphery. High-rise buildings could be compared to the Boeing 747 airplane since they were turned into international technological inventions possessed by every national economy, just as the plane (Yeang, 1994). After great hesitations, European countries which did not want to lose their historical legacy due to the invasion of these seemingly hostile buildings which did not care about anything but themselves, were to participate in this movement following the eager efforts of the USA and Asian countries. Actually, it was in the twentieth century that tall buildings ceased to be exceptional building types, and became the norm (Kohn, 1991).

By virtue of being a multi-fold topic, the construction of skyscrapers was referring mostly to two major features as it has been argued: their symbolic quality as symbols of business and economy in the micro scale, and as symbols of cities and countries in the macro scale. In any case, these were to be conceived not as entirely separate facts, but in a holistic manner, as being each other's cause and effect simultaneously, somehow creating a certain cycle that was triggered continuously by each of these qualities. Being symbols, skyscrapers of the nineteenth and twentieth century were of great communicative capacity like their predecessors. For instance, the form of a corporate skyscraper being distinguishable from the others was pointing out that the respective corporation was standing out against the competitor corporations; the façade of the skyscraper being covered with stone instead of glass was the indication of the corporation being solid and strong, the location of the skyscraper being in the city center was signifying it held an important position in the

social life, and the historical references in its form were signaling that the corporation had strong traditions (Scuri, 1990). High-rise building in its ultimate configuration was then an instrument of advertisement: it was shaped to draw attention and promote successful business. This condition was even more prevalent for the so called postmodern skyscrapers. Citicorp Center (1977) by Hugh Stubbins and Associates, having an extraordinarily big oblique top, was an example standing out as an easily recognizable element in Manhattan's skyline, increasing its real estate value and creating a successful image for its client at the same time (Scuri, 1990). The singularity of form, therefore, was again of crucial significance for it had the potential to constitute a landmark in the city. As stated, the prominent symbolizing qualities of the skyscrapers were of intermingled nature; successful image of a company would immediately mean a successful image of the city. Examples such as Swiss Reinsurance Headquarters, or Arcos Bosques Corporotivo buildings in Mexico City by Teodoro González de Léon, have not only had the effects of re-orienting the old city center and marking new development areas, but they have also created new images for their cities (Nordenson, 2003). Tall buildings could therefore said to form a certain brand value for their respective location. Considering the burst of tall buildings in Asian countries, Hong Kong for instance, it appears as an important geographical area known for its buildings soaring high into the sky, along with a few other cities in the world. The imagery of high-rise construction in Hong Kong is a logical expression of its territory, and it can be envisioned as an abiding image of the contemporary metropolis (Smith, 1991).

Figure 2.14 : Citicorp Center, Hugh Stubbins and Associates, 1977

Figure 2.15 : Swiss Reinsurance Headquarters, Foster & Partners, 2001-2003

Figure 2.16 : Arcos Bosques Corporotivo, Teodoro González de Léon, 1996

Figure 2.17 : Hong Kong skyline

All through history, high-rise was regarded and respected as a powerful symbolic tool. From the primordial examples to the nineteenth and twentieth century skyscrapers, building tall was always associated with structures of power being primarily of religious, political and economic nature; indicating divinity, sublimity, capability, nobility, status, and technical knowledge. Symbolizing a religion, belief, family, community, corporation, city or country was generally the prevailing purpose. However, towards the end of the twentieth century, the symbolic value was about to undergo a metamorphosis, while the function of high-rise building was beginning to stand out and to be considered more carefully.

2.2 A Breaking Point: From Symbol to Function

Ever since the industrial revolution, the nature of life has been rapidly changing especially in big cities, turning them into highly populated metropolises comprising large urban areas. Being developed to house office facilities at the beginning, the youngest high-rise typology, skyscraper, has surely been part of this change to a great extent. The continuous construction of skyscrapers was inevitable in a world where the majority of the population was living in large cities, considering the condensed way in which the work and life were carried on (Lepik, 2008).The idea

that tall buildings might have been used for other functions was then coming forth as a powerful notion. Increasing land values, the globalization process of trade, and expansion of urban populations were among important factors rendering high-rise buildings indispensable (Yeang, 1994). The urge to provide sufficient and efficient space for the exponentially growing population in cities was quite intense, and the monumental and symbolic tower was to compromise its identity in order to fulfill the need. For instance, Empire State Building was not designed to symbolize one corporation or one man, but to supply rentable office space, unlike the Chrysler or Woolworth Building (Kohn, 1991). This was actually signaling the beginning of a new era of high-rise buildings. In fact, tall buildings might be seen as ideal urban planning inputs since they could offer a high density wherever desired (Baransü, 1992). For high density of people involved in high density of functions was the condition of the metropolitan centers emerging in the twentieth century, high-rise was apparently a very intelligible solution for a life style where all possible kinds of activities had to take place in close proximity. The shift of the tall buildings towards this new pattern was also put forward by Rem Koolhaas in his Delirious New York:

> "In 50 years the Tower has accumulated the meanings of: catalyst of consciousness, symbol of technological progress, marker of pleasure zones, subversive short-circuiter of convention and finally self-contained universe. Towers now indicate acute breaks in the homogeneous pattern of every-day life, marking the scattered outposts of a new culture" (Koolhaas, 1994).

Figure 2.18 : Empire State Building, Shrive, Lamb & Harmon Associates, 1930-1933

Thus, new concepts were being introduced into high-rise building design and new points of view were being adopted. If skyscrapers could serve businesses, they could also be models for the densification of multiple functions in one single building. In spite of being a theoretically reasonable and exciting idea, multi-use has not replaced the already existing skyscraper notion immediately and completely. Right before the World War II, skyscraper existed as two discrete concepts; repetitive and homogeneous commercial high-rise on one hand, and complex, self-sufficient city model high-rise, composed of complementary functions on the other (Ábalos & Herreros, 2003). Therefore, the symbolic value of tall buildings was still in competition with the newly developing idea of extensively and primarily functional high-rise. It was between 1950s and 1960s that the tall office building stopped being perceived as a homogeneous and autonomous structure formed to accommodate a single function in a series of repetitive floors, and started to be seen as an accumulation of differentiated functions through interconnected superpositions and juxtapositions, also in communication with other urban systems (Ábalos & Herreros, 2003).

Being of great influential value, the Rockefeller Center (1933-1940) by Raymond Hood built in the first half of the twentieth century is one of the first and most prominent multi-use tall building examples, namely an archetype. The overall plan has involved from the beginning cultural uses, stores, atria, and public spaces including wide pedestrian areas, to which an ice-skating rink was later added (Lepik, 2008). A new urban model consisting of tall office buildings and successful urban spaces was brought out by the completion of the Rockefeller Center in New York City, which was made of a number of buildings coexisting and generating collectively a composition of figural void and figural solid (Pedersen, 1988). Hence, it could be thought of as a city on its own, but in a smaller scale, for it sheltered various activities imitating some of the patterns belonging to the structure of the city. The Rockefeller Center was indeed an ingenuous mix of functions with its roof gardens, open urban areas, and concert halls; and a skyscraper city with its comprehensive composition of a group of skyscrapers fitting into their spaces and creating new urban settings (Lepik, 2008). In addition, regarding this novel viewpoint to the tall office buildings, it could also be seen as a signal for the reemergence or reinterpretation of a previously discussed concept, the skycity, in a completely different and new context. The multiblock formulation of the Rockefeller Center might be compared to San Gimignano's towers which had a certain relation to the Gothic piazza and dwelling, in terms of its complex morphology: an extrusion of a

minimal square plan, relating itself to lower and more useful buildings (Jencks, 1980).
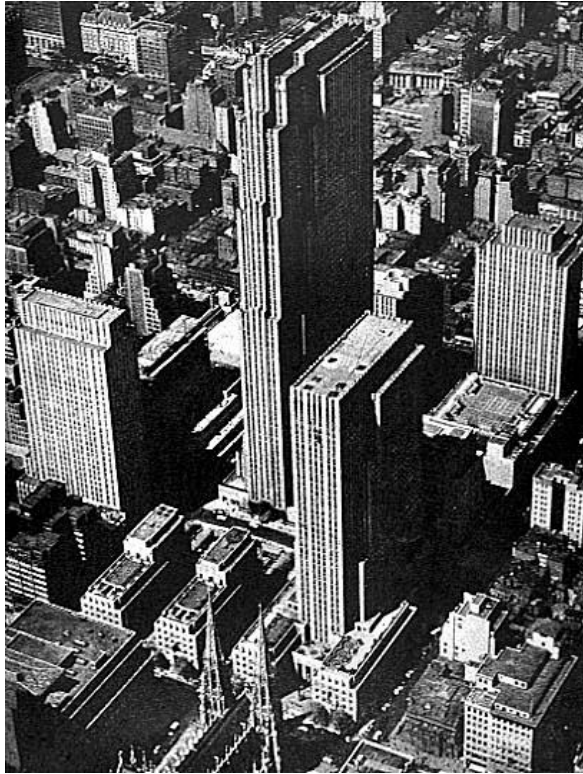
Figure 2.19 : Rockefeller Center, Raymond Hood, 1933-1940

Figure 2.20 : Rockefeller Center, Raymond Hood, 1933-1940

Lever House Building (1950-1952) and Seagram Building (1954-1958) are other visionary examples which diverged from the well accepted homogeneous office skyscraper idea. Their common point was that they both had some efforts to create public spaces at the street level; nevertheless, both buildings could not said to be real examples of multi-use high-rise, but only its anticipators, since they predominantly consisted of office areas. Anyhow, they were very important archetypes in the high-rise development because of their glazed transparent box structure in terms of construction, and because of their relation to their urban settings at the street level in terms of functions: Seagram Building was set back from the street, forming a public square in the front, and Lever House Building was raised up on supports in order to provide a public open space (Lepik, 2008).

Figure 2.21 : Lever House, Skidmore, Owings & Merrill, 1950-1952

Figure 2.22 : Seagram Building, Mies van der Rohe & Philip Johnson, 1954-1958

It was by the construction of Marina City (1960-1967) by Bertram Goldberg that extended functions were incorporated in tall buildings, which included the residential use for the first time. The project housed offices, retail and sports areas, a theater, parking lots, and was connected to two transportation systems being the vehicular traffic and Chicago River (Ábalos & Herreros, 2003). Functioning as a total complex, Marina City had also green areas, an ice-skating rink, and a private landing stage on Chicago River, adding up to form a micro city, or city within city, along with its commercial and residential spaces; it was also possible to reach directly in the towers by car through a spiral drive starting from the street, a fact that combined with the open façades of the parking areas, created a highly dynamic look previously unfamiliar to the high-rise tradition, but also to the city itself (Lepik, 2008).

Figure 2.23 : Marina City, Bertram Goldberg, 1960-1967

Following the innovative discourse of Marina City about the organization of functions, Chicago witnessed the emergence of John Hancock Center (1965-1969) as another multi-use high-rise model in a few years. The project tried to realize a self-sufficient vertical city concept, including restaurants, residential units, retail services, offices, parking, and mechanical floors in a compact and layered configuration; residential areas were in the upper floors in order to dominate the urban realm, in addition to sports facilities or clubrooms occupying the roof level, while offices, retail spaces, and public facilities were situated in lower levels close to the lobby so that they could be easily reached (Ábalos & Herreros, 2003). John Hancock Center was actually an expression of the concept of "a city within city" as formulated earlier by Raymond Hood, with its combination of several different functions such as the business floors and parking areas at the lower eleven floors followed by office spaces of twenty-nine stories, a hotel, a bar and a restaurant, an

observation platform, a supermarket, a post office and a swimming pool (Lepik, 2008). Therefore the project could be said to house a great amount of the facilities needed in people's everyday lives in the big metropolis. In any case, one important factor was not carefully considered. The self-sufficient universe of the John Hancock Center might have worked well on its own; still the connection to the street was not quite strong. In terms of urban planning integration, the building was not really a model, for no obvious relationship between the urban space surrounding the high-rise and the building itself was shown in the plaza in the front (Lepik, 2008). Hence, the metamorphosis of the tall building was on in the second half of the twentieth century, but still quite far from expressing all of its potentialities.

Figure 2.24 : John Hancock Center, Skidmore, Owings & Merrill, 1965- 1969

The increase in the urban population was the most prominent reason for the densification of functions and people in small land areas, leading to mixed-use high-rise. Another factor was to emerge soon to reorient high-rise design as the scarcity of resources and energy was beginning to stand out as an important issue in whole world, and since the building industry was extremely energy and material consuming, it was the first to reflect the consequences of this new situation. When energy was cheaper and the consciousness level about the environment not very

elevated, bulky high-rise buildings were designed with very little concern for their unwanted effects on the environment; however, mainly due to the European laws about energy efficiency and individual efforts, innovative models and strategies have developed for energy efficient tall buildings (Riley, 2003). In fact, being very large in size, it was almost obligatory for high-rise buildings to consider their consequences on the environment, even if it was long ignored throughout history and development of the twentieth century skyscraper, and no sincere attention was paid to the issue while the world's big cities were in the process of redecorating their skylines with tall buildings. But after all, it was evidently imperative for the architects to be aware of the scarcity of energy resources and design for sustainable solutions as Yeang stated (Yeang, 1994).

Since it has been shown by various studies that a compact urban form with a great intensity of population could help reduce the energy consumption in a city, especially in terms of lowered transportation costs, this urban model was cited by Yeang as an important justification for the densification of the city, and therefore for the skyscraper (Powell, 1999). Adding all kinds of ecological concerns to this densification formula, mixed-use high-rise that emerged firstly in 1930s and continued to develop through 1950s and 1960s was to become part of a more expanded definition. Mixed-use was turning into a more attractive technological and planning choice while sustainable development and environmental protection were being focused on; as a sustainable city could not be achieved with a spatial organization demanding mobility as a crucial structural condition, it was standing out as a model offering the possibility to reduce the need for mobility and to optimize energy consumption by its space organization, mingling diverse interior climates in the building (Ábalos & Herreros, 2003). As a matter of fact, the appropriate technological conditions to obtain sustainable and energetically self-sufficient buildings or the involvement of green areas creating public spaces were not only important in terms of taking environmental precautions, but also and equally important in terms of creating more humane spaces all through the tall building, since it was far different from the tall homogeneous office building where the life stopped after work hours; multi-use high-rise was now a collective place to be lived in permanently. Still, even before the ecological multi-use high-rise, some preliminary ideas concerning greener and more humane environments in tall building design were put forward. As an example, Le Corbusier's Ville Contemporaine (1922) project consisted of multistory residential tower blocks designed to intensify green urban areas, but not densification, so that no large plots

of land would be occupied by large and numerous lower buildings on the ground level, but only by nature and green spaces (Ciravoğlu, 2007). However the project was never constructed.

Figure 2.25 : Ville Contemporaine, Le Corbusier, 1922

Not being ecological by definition in the first place, since the primary raw material and energy inputs are extraordinarily high, tall buildings as an indispensable element of the condensed cities were reevaluated due to the oil crisis in 1970s, and solutions improving the energy use were put forward (Lepik, 2008). Anyhow, it would have taken some more time before high-rise buildings involving extensively ecological principles in their construction and running processes would appear. The first efforts concerned tall office buildings as they were the prevailing type, and the mixed-use was only at the beginning of its development phase. Norman Foster's Commerzbank Headquarters Building in Frankfurt is an example of first ecological skyscrapers; it is organized in modules of interior space and provided with views and natural light (Nordenson, 2003). Built in 1997, the building has interior air shafts reaching upwards and allowing natural light into the workstations which have their own supply of fresh air, resting and relaxation areas for the staff, and a ceiling cooling system that uses circulating water (Lepik, 2008). Another architect who has notably shaped ecological design is Ken Yeang. According to him, ecological design means a holistic consideration of the use of energy in a sustainable manner, through the life cycle of buildings, and reducing their impact on the nature; thus, his ecological design strategy for high-rise is primarily about considering it in terms of energy (Powell, 1999). One of Yeang's archetypal green tall buildings is the IBM Plaza, which has not only taken minor ecological precautions, but has tried to encourage multi-use and relationships at urban level. The project completed in 1987, is an office tower in which vertical landscaping has been incorporated

diagonally across the face of the building, and responding to the climate both by form and plan is taken into consideration as an important matter; it is also a hybrid form, connected by a bridge to a lower building which houses a food court and a restaurant, to other low-rise buildings with commercial shops, and to the pedestrian plaza surrounding it (Powell, 1999). The building therefore might be said to form one of the examples combining multiple functions with green principles. Menara Mesiniaga is another of Yeang's ecological tall building projects in which a number of principles are applied. It is oriented according to the daily path of the sun, its core with elevator shafts and staircases facing east prevents the heat from entering the building up to midday and aluminum sunscreens at the south in noon and afternoon, a semicircular sloping garden around its base continues inside as planted spiral terraces which offer relaxation zones for people; and hence Menara Mesiniaga stands as some kind of translation of ecological principles into high-rise design, influencing subsequent high-rise buildings on an international level (Lepik, 2008).

Figure 2.26 : Commerzbank Headquarters, Foster & Partners, 1997

Figure 2.27 : Menara Mesiniaga, Ken Yeang, 1991-1994

built form   planting   solar orientation   shading devices
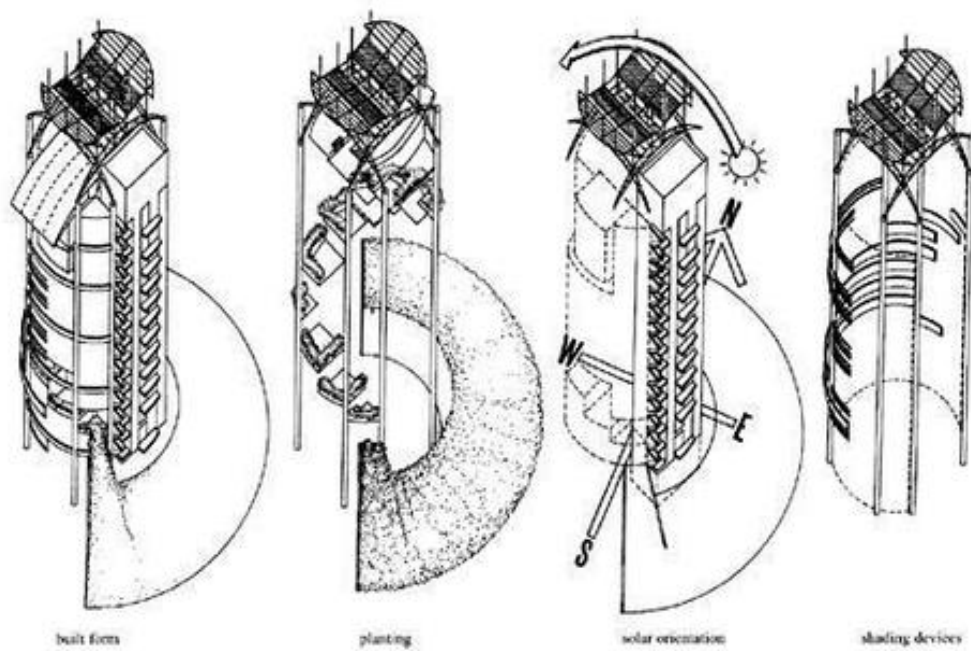
Figure 2.28 : Three-dimensional diagram showing the built form, planting, solar orientation and shading devices of Menara Mesiniaga, Ken Yeang

High-rise buildings are important architectural objects still partly conceived as monuments, or symbols of human achievement, and of any kind of structure of power and authority. They are admired, appreciated, or wildly criticized or disliked because of their numerous properties with positive or negative impacts on their surroundings. Nevertheless, it has to be recognized that at a certain point a shift occurred in the way the concept of high-rise was considered. Transforming into the twentieth century skyscraper, tall buildings have acquired a brand new identity. The skyscraper was born out of necessity combined with humankind's strong desire for self-exaltation, and varying degrees of these have coexisted as different combinations in each tall building. Necessity therefore, has risen as the key issue regarding the matter, since symbolism has already been very significant in high-rise design all through its existence. This key issue in turn, has also gone through its own transformations up to the present day; from economic requirements, to the population increase and to ecological concerns, the high-rise has experienced very distinct modifications about its form, function, location, and meaning in general. The complexity of tall buildings has obviously increased; besides commercially viable spaces, and environmental and social agendas, multiple hybrid programs such as entertainment, shopping, transit, observation are also being considered among their functions (Nordenson, 2003). In any case, it is also clear that there is still much to be considered and reconsidered, as high-rise is a key element of the metropolis, and the way the life evolves in the city requires its integration to the urban environment in proper ways.

3. UTOPIAN POTENTIAL OF HIGH-RISE

As the issues discussed in the previous chapter have shed a certain light on the emergence of high-rise and its significance, it is thought that considering tall buildings in terms of their utopian potential could be of additional use in providing a greater understanding of the changes they have been going through, and especially of the appearance of a new generation of this building typology in the twenty-first century and its integration into the urban environment, which are to be discussed in the next chapter.

Following the consideration of the concept of high-rise both as symbols and functional tools, it is crucial to understand how the term has potentially held a utopian meaning in its definition and through its development process, since the utopian potential may be conceived as a very important factor having implicit and/or explicit impacts on architecture, and on tall buildings in particular. To evaluate deeply the issue, it is essential to discuss the definition of the notion of utopia by going through its emergence, literary development, and involvement in architecture in the first place. Secondly, it would be suitable to examine utopian design in terms of high-rise buildings, and refer to some examples in order to comprehend further how high-rise might be a tool for utopias, and how utopian thought might support the development of tall buildings in a reciprocal relationship.

3.1 The Notion of Utopia

In order to achieve a general understanding of the notion of utopia, referring firstly to its dictionary definitions would be beneficial. The Merriam-Webster's Online Dictionary defines the word 'utopia' as:

> "1: an imaginary and indefinitely remote place
>
> 2 often capitalized: a place of ideal perfection especially in laws, government, and social conditions
>
> 3: an impractical scheme for social improvement" (Merriam-Webster's Online Dictionary, 2009).

Then again, the term is defined in Encyclopedia Britannica as:

> "an ideal commonwealth whose inhabitants exist under seemingly perfect conditions. Hence 'utopian'' and 'utopianism' are words used to denote visionary reform that tends to be impossibly idealistic" (Encyclopedia Britannica, 2009).

On the other hand, the Compact Oxford English Dictionary depicts it as:

"An imagined perfect place or state of things" (Compact Oxford English Dictionary, 2009).

There are certain common points in all definitions drawing considerable attention: first of all, utopia is described as a place, therefore wherever location or space is being considered, it is relevant to involve architectural discourse in it; secondly, this place tends to be somehow imaginary, or impossible. It would also be meaningful to revise the etymological roots of the term in order to achieve a better grasp of the issue. Firstly used by Sir Thomas More, author of the book titled Utopia, the word derives from a Greek origin word. It is made of the composition of two words, being ou (not, no) and topos (place), adding up to the word utopia, as in the ideal and imaginary country in More's Utopia written in 1516 (Merriam-Webster's Online Dictionary, 2009).

Utopia has always been perceived from very different perspectives; for some people it is associated with a place of ideal perfection, as in the earthly description of paradise, for others, it symbolizes a completely impractical, non existing place, and for some it includes all those qualities at the same time. However, in order to clarify the confusion, it was brought into light by Patrick Geddes that the word might not only be derived from the Greek ού-τοπία (no-place), but also from the word εύ-τοπία (eutopia) which means good place (Doxiadis, 1966). Thus, referring to the term utopia as a currently non existing and impossible, but still as a somehow feasible and desirable matter, would be practical in a number of ways, especially in considering its generative character.

Although a description of place generally exists in all utopias, and may be said to be almost intrinsic to the notion, utopia indicates a holistic system with diverse components; social life, political views, economic status, and architectural features are very often depicted as the basic elements of this system. The system in turn, might seem to be static or dynamic in different examples, but it should be considered that it is mostly self-sufficient and consists of potentialities. To emphasize the generative potential of utopia, it could be defined as the articulation of possibilities intending to work to accomplish their realization; or in other words as a model that clarifies and suggests the attitudes which might stimulate its own fulfillment under existing conditions (Coleman, 2005). In these terms, utopia is both a no-place to be realized and a good place formed of numerous potentialities.

As stated, the first place the word utopia is encountered in history is literature, as both the name of Thomas More's visionary book and the ideal and imaginary island described in it. Establishing a whole new genre, More narrates an idealized nation state where everything about social, political, cultural life is preset and town planning is described in detail as an important part of the whole (Herwig & Holzherr, 2006). However, even before it was named as a notion, utopia had existed in earlier literary examples. Philosophers such as Socrates, Plutarch, Strabo, Aristotle and Zeno were also creators of ideal systems, but much renowned is Plato, for his Republic and other writings such as Criteas and the Laws, where he proposed an ideal community and city for which he deserves to be known as the first utopian (Doxiadis, 1966). Afterwards, the efforts to define the ideal, whether political, economic, religious, scientific and technological, were continued by several thinkers and novelists who put forth visionary ideas. Tommaso Campanella, Francis Bacon, George Orwell and Aldous Huxley are some of these writers, of whom the latter two chose a different and satirical way of talking about utopias. Orwell's Nineteen Eighty-Four (1949) and Huxley's Brave New World (1932) might be seen as two major examples of dystopian literature where previsions of a pessimistic world prevail (Babaoğlu, 2004). For instance, in Brave New World science and technology are greatly advanced - which is a commonly desirable situation- but the society is corrupted, and instead of an ideal and happy place, the world has turned into a dystopia, or in other words, in a bad utopia where everybody seems to be happy but nobody is actually satisfied by the system, and moral values are no more valid. A similar dystopian scenario is also prevalent in Nineteen Eighty-Four, where the world is divided into a very small number of great states and their political systems work seemingly very well, but human beings lost their free will and freedom to do and think whatever they really want to, and every moment of one's life is strictly under surveillance. Hence, a basic shift of the human condition, even if partly, is proposed by utopias (Coleman, 2005), but it does not necessarily mean that this transformation would be positive. As well as they can be instructing and orienting toward more efficient solutions, utopias can also be destructive or warning of the danger of what the current reality might turn into. Therefore, it should be considered that utopia as a nonexistent and/or good place, might also imply a bad place.

Place and architectural depictions are often mentioned in literary utopias. In fact, the common characteristic of almost all utopian examples in literature portraying the ideal society and its lifestyle is the representation of the physical environment

people are supposed to live in, and sometimes it is also possible to encounter drawn images of these environments (Yalım, 2002). The illustration of More's imaginary
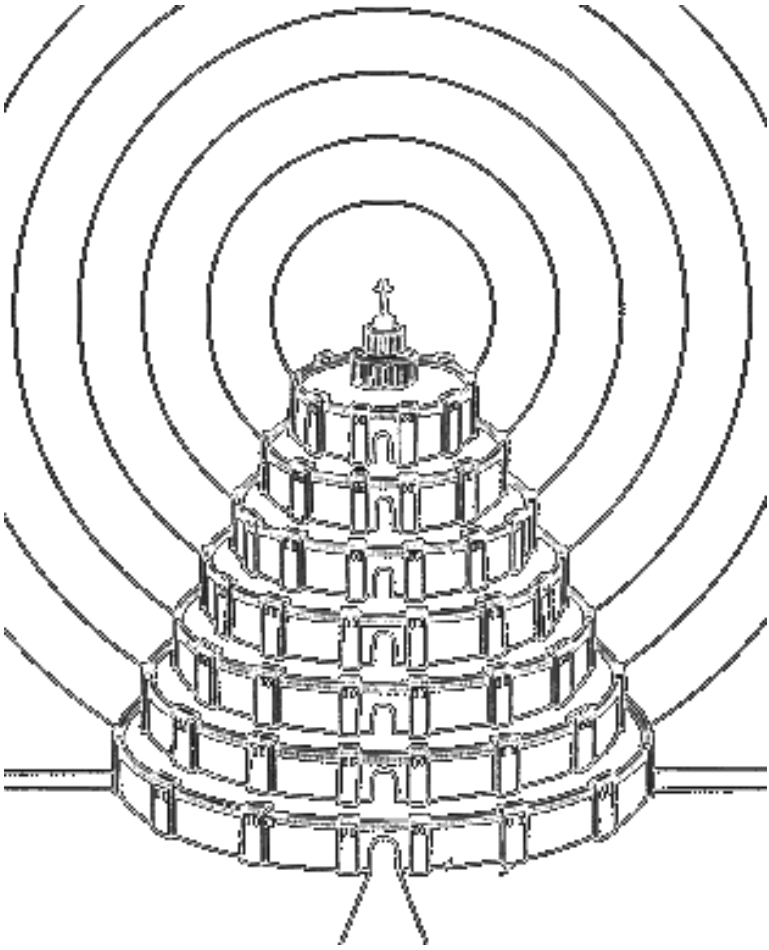

Figure 3.1 : Utopia Map, Ortelius

Figure 3.2 : Illustration of the City of the Sun

Utopia Island, or Campanella's City of the Sun with its seven circles of walls protecting the city located in an ideal climate, might be said to be prominent examples. Furthermore, the ideal city fantasies of the Western civilization are affirmed to be affected by three important narratives being More's Utopia, Jerusalem as described in the Bible, and Plato's description of Atlantis; the ideal city results thus as a perfect geometry consistent of squares or concentric circles (Herwig & Holzherr, 2006). Anyway, transferring from literature, over the time utopia has become a leading subject of architecture itself. What might be called as utopian projects are generally those aiming to modify the city and its life, which are thought of as impossible to build, probably because of technological, economic, or social obstacles, and they are mostly hard to adopt because of being beyond ordinary human understanding and reason (Yalım, 2002). As a separated matter form literary utopias, the main difference of architectural utopias from the literary ones seems to be the fact that the latter mainly tries to set an ideal social and political system in which architecture appears as a consequence or by-product, whereas the former is more likely to deal with cities, urban areas and even single standing buildings, even if an implication of the attempt to bring a new and ideally working order to the society through these is generally present. After all, utopian dreams develop out of the limited conditions of the present as imaginations of social potential, on the contrary to the idea that the status quo of the current conditions is the mere possible one, which is an opinion restricting visionary abilities (Coleman, 2005).

The most significant utopian examples in architecture first emerged in the late nineteenth century, following the industrial revolution. The response of man to the industrial and technological advancements followed closely by the increase in population in the cities, was creating small garden cities and new transportation means such as cars and highways in the first place. The garden city movement hence gained momentum in order to create healthy living environments for the working class; still it was an unsuccessful escape from the city growing in an unhealthy manner, which later engulfed the isolated cells of the garden cities (Doxiadis, 1966). A well known example of garden cities representing an early effort to reconnect countryside and city is Ebenezer Howard's idea of the Garden City: a garden surrounded by public buildings such as the theater, the town hall, library and hospital, and by additional public green areas was at the center of the city, beyond these, there were compact housing zones set in vast ground areas, and production infrastructures such as warehouses and factories which were to connect to distant markets through a railway were situated on the edge of the city (Jennings &

Newman, 2008). Howard's Garden City, could therefore said to be utopian for it is an unrealized attempt to build a new industrial age society by means of a whole new approach to town planning; it is utopian since the ideal form and ideal way of being of the city were put forward in addition and in relation to the way of being of the society. In any case, utopia appears as an unavoidable associate of architecture; utopias and architectural projections are in close relationship since they both argue against the inadequacy of existing conditions, envisioning a future superior to the present time (Coleman, 2005).
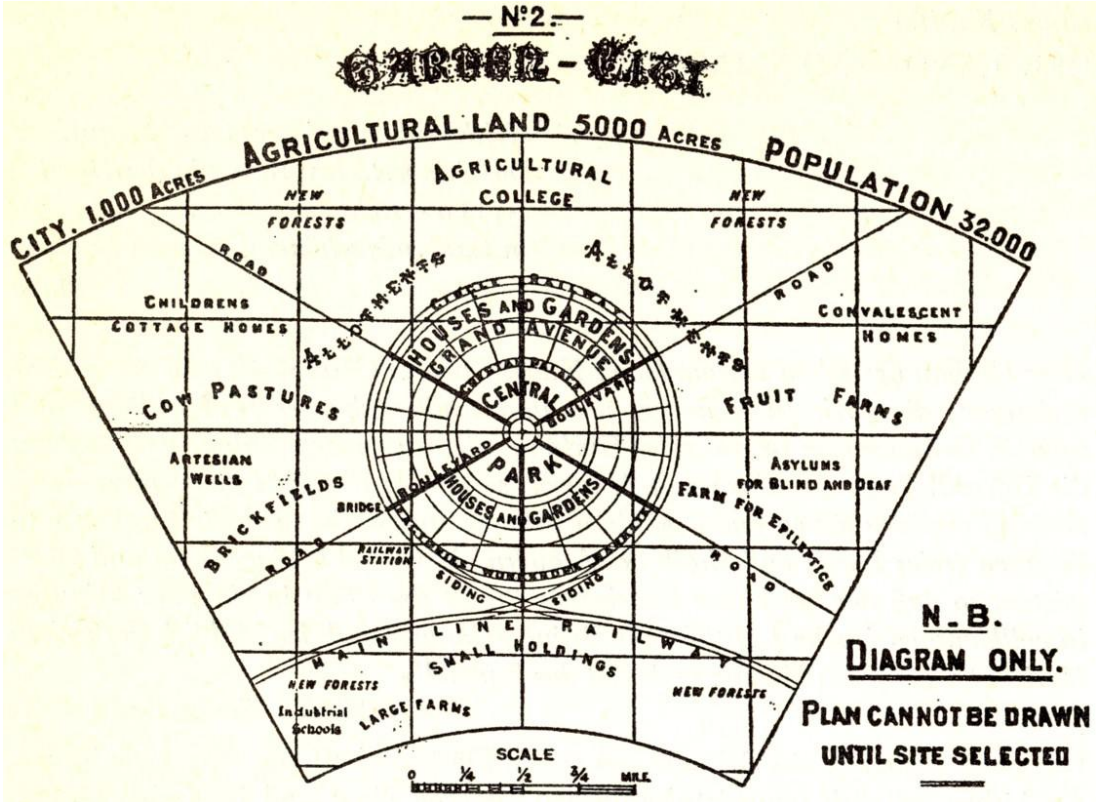
Figure 3.3 : Diagram of the Garden City, Ebenezer Howard

As cities continued their sprawl, several proposals such as the Industrial City by Tony Garnier, or the linear city theories by Soria and Mata were made following Howard's Garden City; but they were somehow insufficient to deal with the whole of the city in the transformation phase to the metropolis. Other conscious attempts were put forward by Le Corbusier's and Frank Lloyd Wright's proposals who chose to handle the question as an entity, rather than dealing with small fragments as their predecessors did. Anyway, despite their efforts, both architects' projects had some deficiencies: in his La Ville Radieuse, Le Corbusier ignored the dynamic character of the city, and on the other hand, Frank Lloyd Wright rejected the density of the twentieth century city, trying to create a pattern of non-built-up and built-up areas where a very low density was proposed for the city. Both projects had positive and

negative contributions to architecture and city planning because of their humanistic aims, and because of giving way to unrealistic implementations which could not be called as eutopia - good place, respectively (Doxiadis, 1966). Therefore, modern architecture too, might be affirmed to have declared some intentions about building the ideal - which is almost a prerequisite of being utopian- but in practice, it should be recognized that utopia includes a much more holistic consideration which cannot be reduced to merely the construction of an ideal building or ideal city of which the impacts on the environment and daily life in all respects are neglected. The immediate and direct application of the modern architecture with little attention for its effects, and its approach to the transformation of the cities in terms of technological means but not through political or social change highlights its non-utopian aspect (Coleman, 2005).
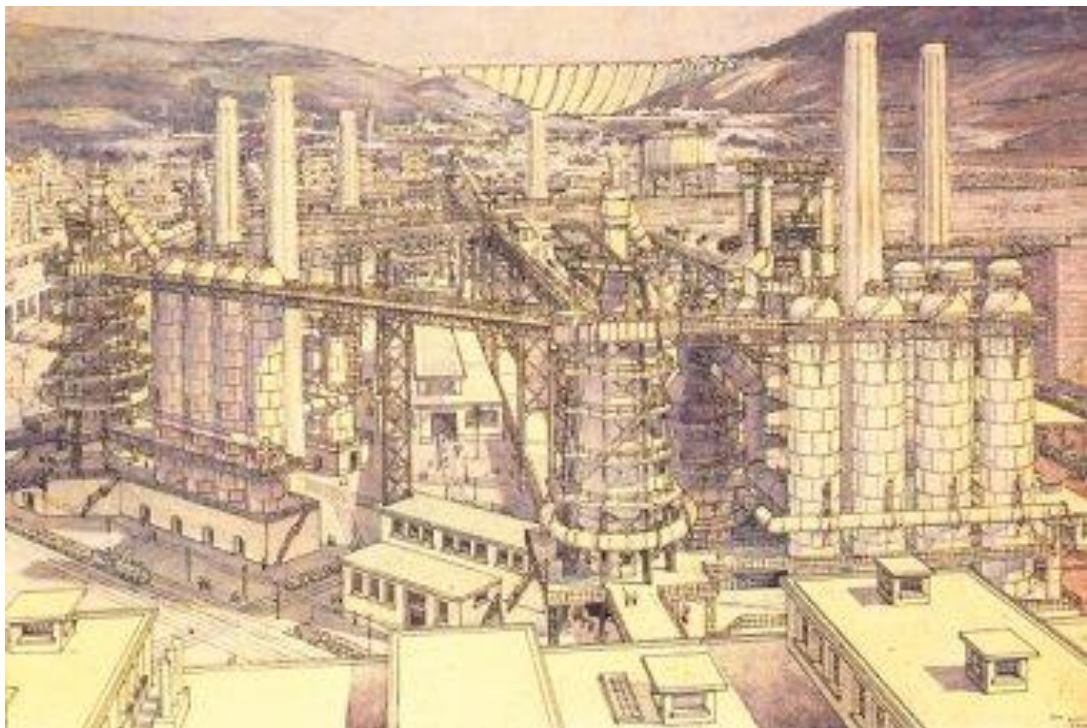
Figure 3.4 : Illustration of the Industrial City

Following the garden cities and proposals of modern architecture, 1960s had a genuinely important role in utopian design. The Archigram group and metabolist movement arose in 1960s in Europe and Japan respectively. Archigram architects suggested a continuous transformation by designing modular shells in the Plug-in City project, and huge bug like structures moving on the earth from one place to another in the Walking City project (Yalım, 2002). Metabolists were influenced by similar ideas as well, and by Archigram's projects. Among their well known projects are the Marine City by Kyonuri Kikutake where the architect pointed out the

possibilities of oceans and designed an extension for Tokyo onto the sea, and Kenzo Tange's Plan for Tokyo, again a project growing over Tokyo Bay, consistent
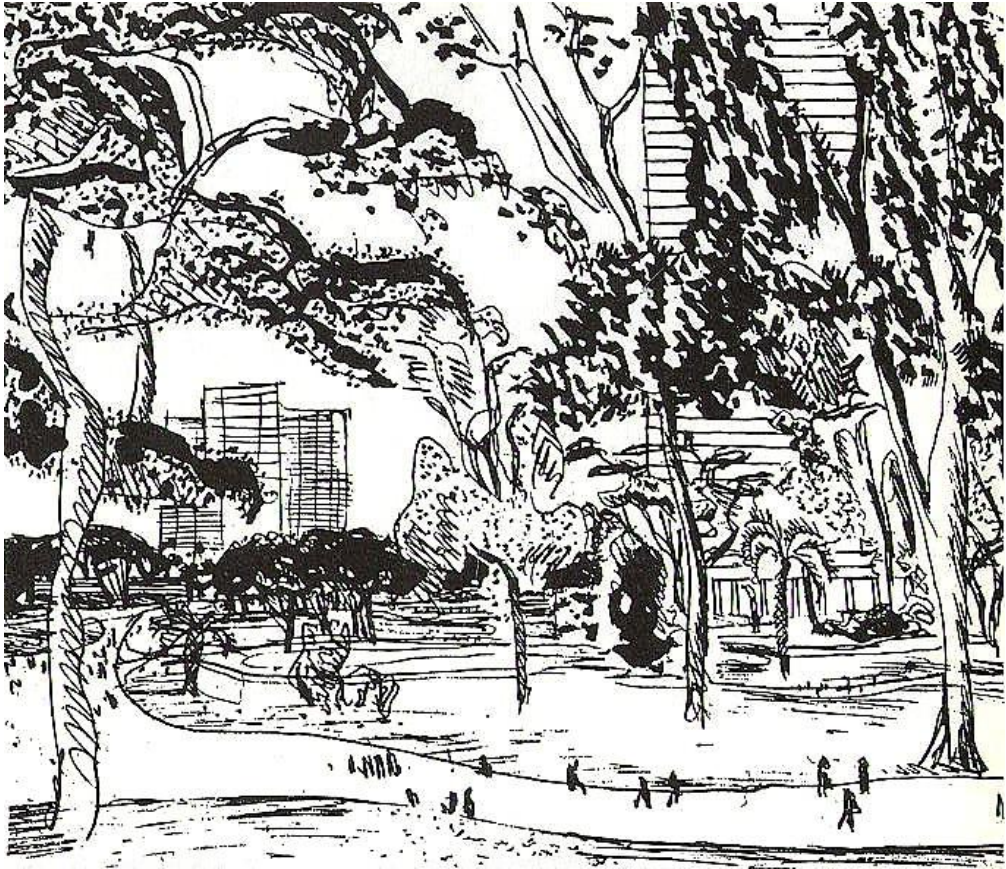
Figure 3.5 : La Ville Radieuse, Le Corbusier, 1924
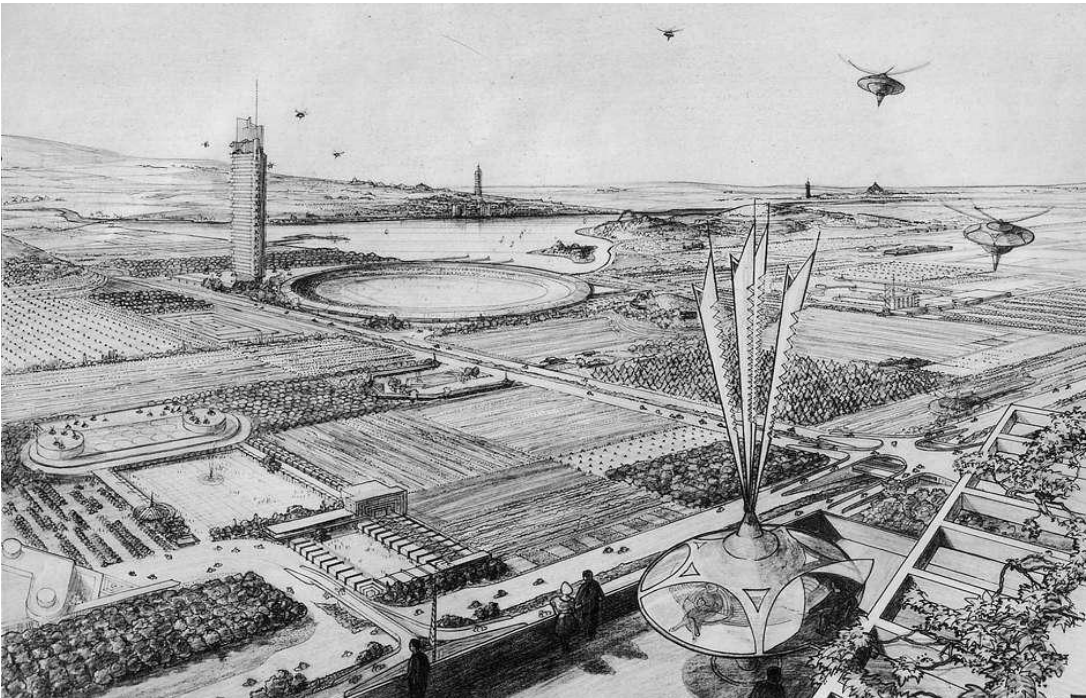
Figure 3.6 : Broadacre City, Frank Lloyd Wright
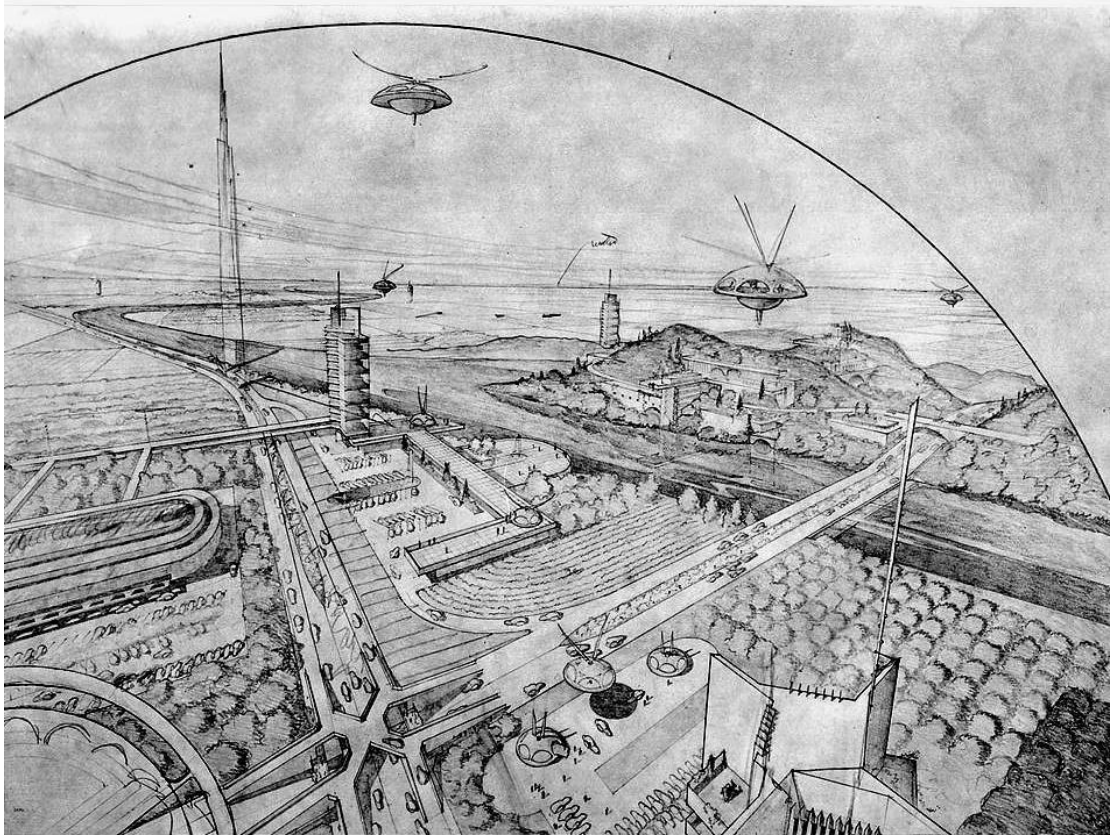
Figure 3.7 : Broadacre City, Frank Lloyd Wright

of bridges, man made islands and megastructures. The common point of these two projects is that they were mainly characterized by the adoption of flexible and extendable structures, enabling the organic growth of the city. At about the same period of time, the Dutch architect Constant Nieuwenhuys was working on his utopian New Babylon project made of sketches, drawings and architectural models. First appeared as a series of models representing different sectors of the future city where all the work was taken care of by underground automated machines so that people would be able to have infinite leisure time and spend their lives wandering in spaces suspended in the air, New Babylon was designed as a dynamic network of these interconnected spaces which were continuously sprawling across the surface of earth; as a consequence, its inhabitants were free to rearrange and redefine every detail of their environment in the sectors (Wigley, 2001). New Babylon is a very significant example of utopian design since it did not only suggest a new social order but it tried to integrate architecture into the daily life of this new society as an inseparable part, or perhaps to put it more appropriately, to create and nurture this order through architecture itself. From another point of view, in his attempt to design a utopia, Nieuwenhuys predicted the appearance of the contemporary non-places, or in other words utopias such as shopping malls, airports and auto routes which

can be compared to New Babylon's dynamic and mobile space concept (McDonough, 2001).

Figure 3.8 : Plug-in City, Peter Cook, 1964-1966
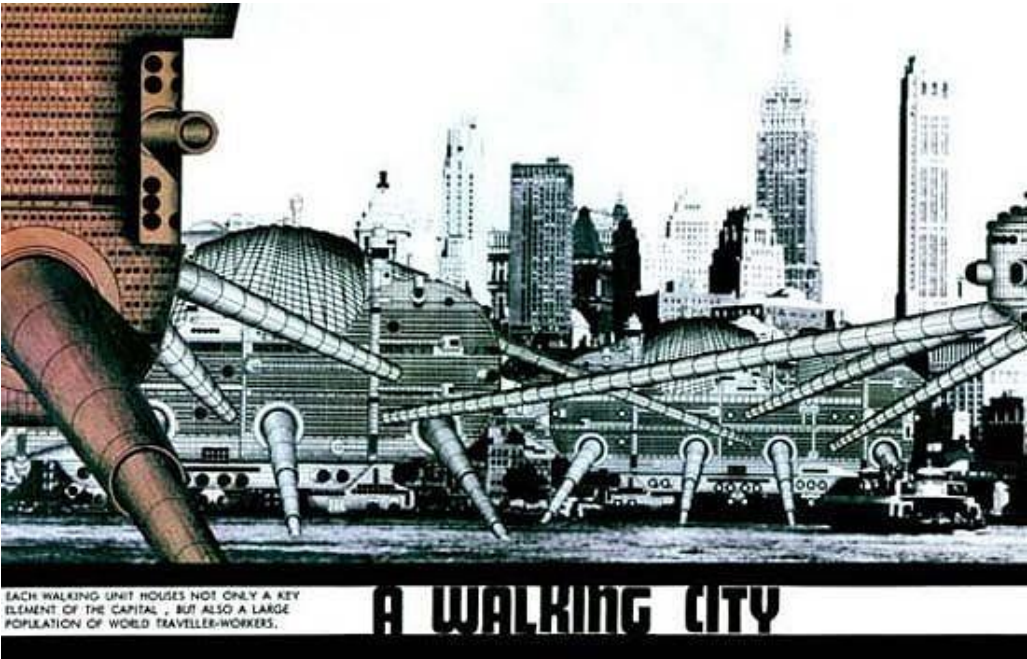
Figure 3.9 : Walking City, Ron Herron, 1964-1970
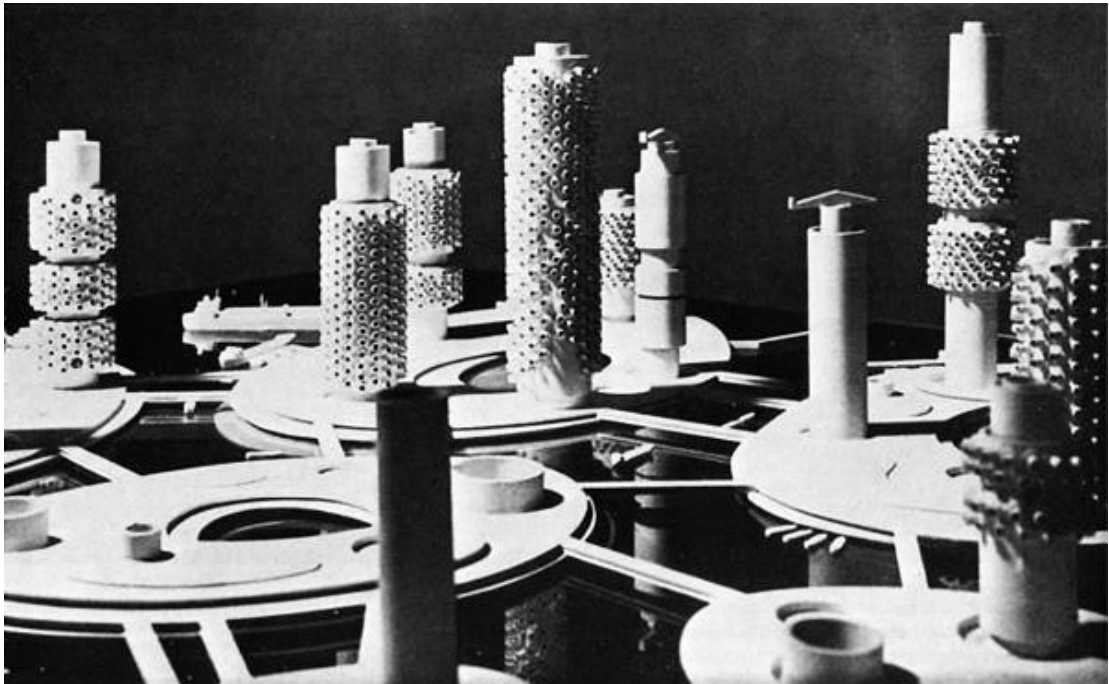
Figure 3.10 : Marine City, Kyonuri Kikutake, 1963
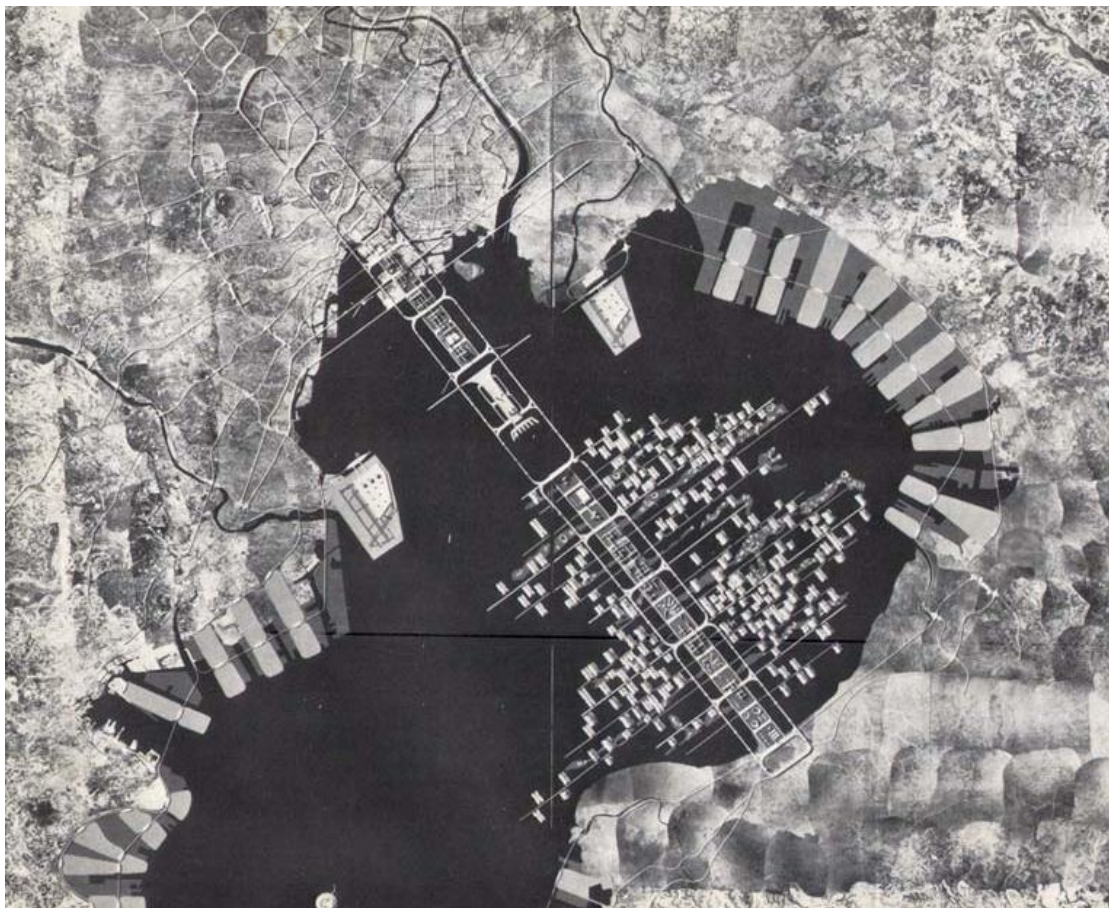
Figure 3.11 : Plan for Tokyo, Kenzo Tange, 1960

Figure 3.12 : New Babylon, Constant Nieuwenhuys

Since its first emergence in architecture as an independent and complex issue rather than as illustrations of a literary genre, utopia has come forth in several designs as a generative and innovative element. Regarded by some as superficial fantasies, the question whether utopias are of any value to architecture has very often arisen. Looking forward, utopias are impossible to formulate without looking back to the past; and transformation is theorized by convincing utopian models in comparison to which the current conditions seem inadequate (Coleman, 2005). Therefore, the basic feature of utopia can be said to be its potential for transformation of the present in a way that cannot be easily prefigured, and which leads to a new set of circumstances drastically different from the existing ones, whether positive or negative. In this sense, utopia may work as eutopia, or dystopia depending on the intent, and the distinction of those may sometimes be ambiguous. Architects thinking of themselves as part of a community tend to believe to be capable of developing settings in and upon which social life might be carried on; they usually work on mediating between reality and imagination, trying to design their anticipating ideas about how things should be (Coleman, 2005). Actually, this is how utopia begins to be beneficial, and in some cases damaging for architecture: it makes room for imagination beyond the easily imaginable and foreseeable; it reconsiders through architecture the positive and negative aspects of the society and suggests solutions which should affect all physical and moral conditions around

which daily life unfolds. Again, as a very prominent utopian example, Nieuwenhuys' New Babylon departs from the idea of changing entirely the manner of living and being of the society through architecture in late 1950s, and comes up with conclusions which reflect the reality of the twenty-first century; even though not in whole details, it gives important hints how life would be in the near future. For instance, the basis of Nieuwenhuys' utopian city lies in the belief that only a dynamic and flexible plan would correspond to the complex and changeable needs of a free society in a continuous phase of creation and recreation (McDonough, 2001). The situation of the twenty-first century is hence more or less projected in terms of mobilization and accelerated life style. On the other hand, as one of the oldest utopian descriptions, Plato's Atlantis can be said to have influenced both Ebenezer Howard's Garden City in the first half of the twentieth century, and Luchao Harbour City project in Shanghai (to be completed in the twenty-first century) which adopted distinctive resemblances to the Atlantis described, such as the circular urban rings and the presence of water as an important element (Herwig & Holzherr, 2006). As a result, the value of utopian design appears as its contribution to the formation of exemplary architecture of which the achievement depends on the optimistic imagery of a better place. The architect's fictional initial story is capable of transforming the part of the world where the building is located and the social life occurring within; furthermore, exemplary projects may remain alive in the imagination long after their completion, preserving their utopian characteristic even when they are materially present, they may encourage the occupants to realize their own desires through the architect's fiction (Coleman, 2005).
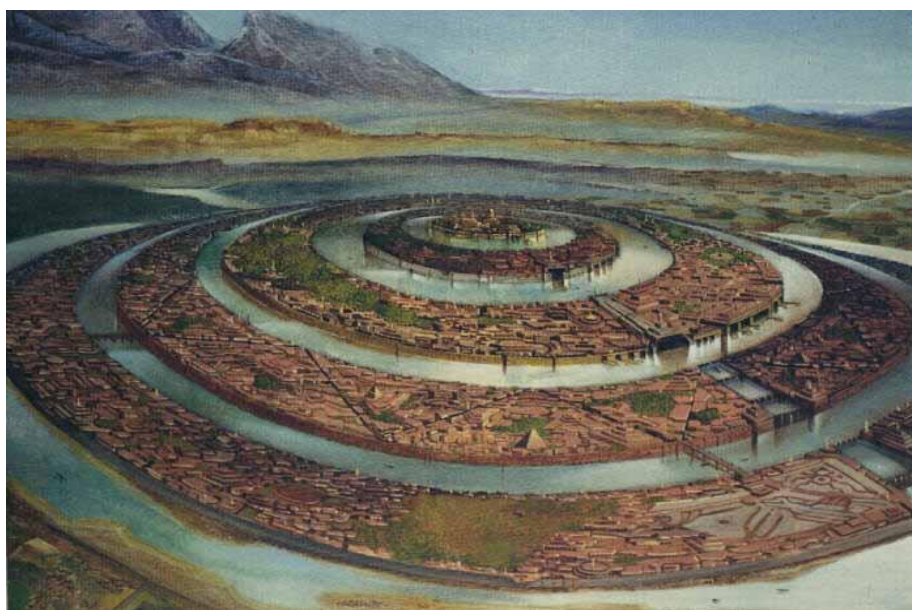
Figure 3.13 : Illustration of Plato's Atlantis
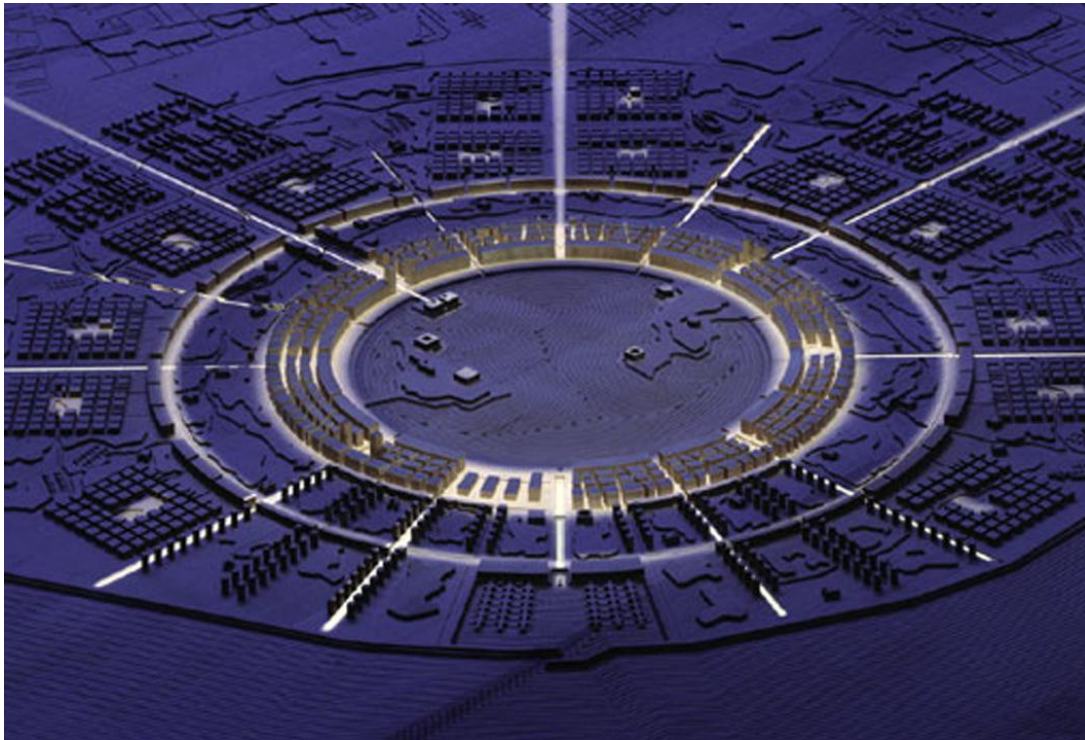
Figure 3.14 : Luchao Harbour City

Since the new generation high-rise buildings appear to have emerged as an important concern of architecture of the twenty-first century, and seem to possess similar aspects to utopias, after this brief discussion of how utopian thought has developed and infiltrated in architectural discourse, it would be adequate to examine how and why tall buildings have become a subject of the utopian design in order to explicate their utopian potential, and to define whether this potential is or may be of any help in the design process of the new generation high-rise in the forthcoming chapters.

3.2 Upward Utopias: Appearance of High-rise as a Tool of Utopian Design

It is not of very rare occurrence that tall buildings have appeared in utopian designs. Since utopia means an ideal and self-sufficient system which often refers to the establishment of a better future, it should be no coincidence that high-rise as humankind's aspiration for heavens and for supremacy in general constitutes part of this system as a powerful image. Usually in the majority of cases the symbolic value of high-rise which was scrutinized in the previous chapters stands as a more important issue than its function. Indeed high-rise buildings very often stand at the core of utopias due to their symbolic value; as Nordenson states for skyscrapers in particular, the intention of building tall is speaking up, standing out in the crowd, and declaring and convincing people of the responsibility of tall buildings to correspond

to social ideals and needs (Nordenson, 2003). At the very moment high-rise designs merge this intention which is a reflection of their symbolic characteristic with functional aims, try to create self-sufficient systems whether in relation with their surroundings or not, and declare themselves as indispensable solutions for future developments, they can be said to behave like 'extensions of utopian thought'.

Utopia has always been a motivating factor in designing tall buildings. It has been capable of nourishing and enhancing the structures of power high-rise buildings were supposed to symbolize, multiplying their power of affecting individuals and masses of people. Being or at least appearing 'impossible-to-build', and creating certain images of 'heavenly life' have been the leading cause in these terms. It can be seen that even before 'utopia' emerged as a notion, those characteristics were intrinsically present in the concept of high-rise if the issues discussed in the 2. chapter are to be reevaluated. For instance, some of the earlier high-rise buildings may be cited as examples carrying utopian traits: they sometimes promoted social ideals such as the unity of humankind like the mythical Tower of Babel, or forced the technical limits of their times like the Gothic Cathedrals in the Middle Ages as previously discussed. The period between the nineteenth and twenty-first centuries is especially remarkable in terms of the increasing frequency of the emergence of architectural utopias; interestingly, it coincides with the emergence of skyscrapers, pointing out some kind of association between these two facts. Koolhaas reveals a strong connection of tall buildings to utopias in Delirious New York, and speaks about the Globe Tower which he specifies as the 1909 theorem. Globe Tower announced in 1909 in the form of a cartoon is a steel structure supporting eighty-four horizontal planes which are absolutely not interdependent. On each level a different scenario is realized; each is a private realm with its facilities, attendants, architectural styles, gazebos and gardens. The architectural programs on different floors may undergo drastic changes but the framework remains the same. The newly born skyscraper is thus defined as a utopian tool serving the creation of a limitless number of virgin sites on one single metropolitan lot. Consequently, in terms of urbanism, each metropolitan lot represents an unstable and unpredictable combination of concurrent activities (Koolhaas, 1994). The system is therefore ideally prefigured to enable an immense richness of activities, and at the same time it constitutes a closed whole which remains indifferent to exterior developments, just like a model for self-sufficient high-rise city.

At the same period of time, several architects in Europe were also interested in proposing tall buildings as parts of their visionary designs for cities which were to

reflect new living scenarios for future metropolises and the aspirations for buildings beyond practical possibility all at once. For instance, August Perret's design of a city of towers and the machine-like tall structures of Italian futurists such as Marco Chiattone and Antonio Sant'Elia were amongst the theoretical design solutions for urban areas; on the other hand, Mies van der Rohe's crystalline skyscraper with a glass skin was a proposal in the competition for a tower block in Berlin, and reflecting the utopian ideas of a German artists and architects' group, Gläserne Kette (Glass Chain) it was quite far from being technically realizable in that time (Lepik, 2008).
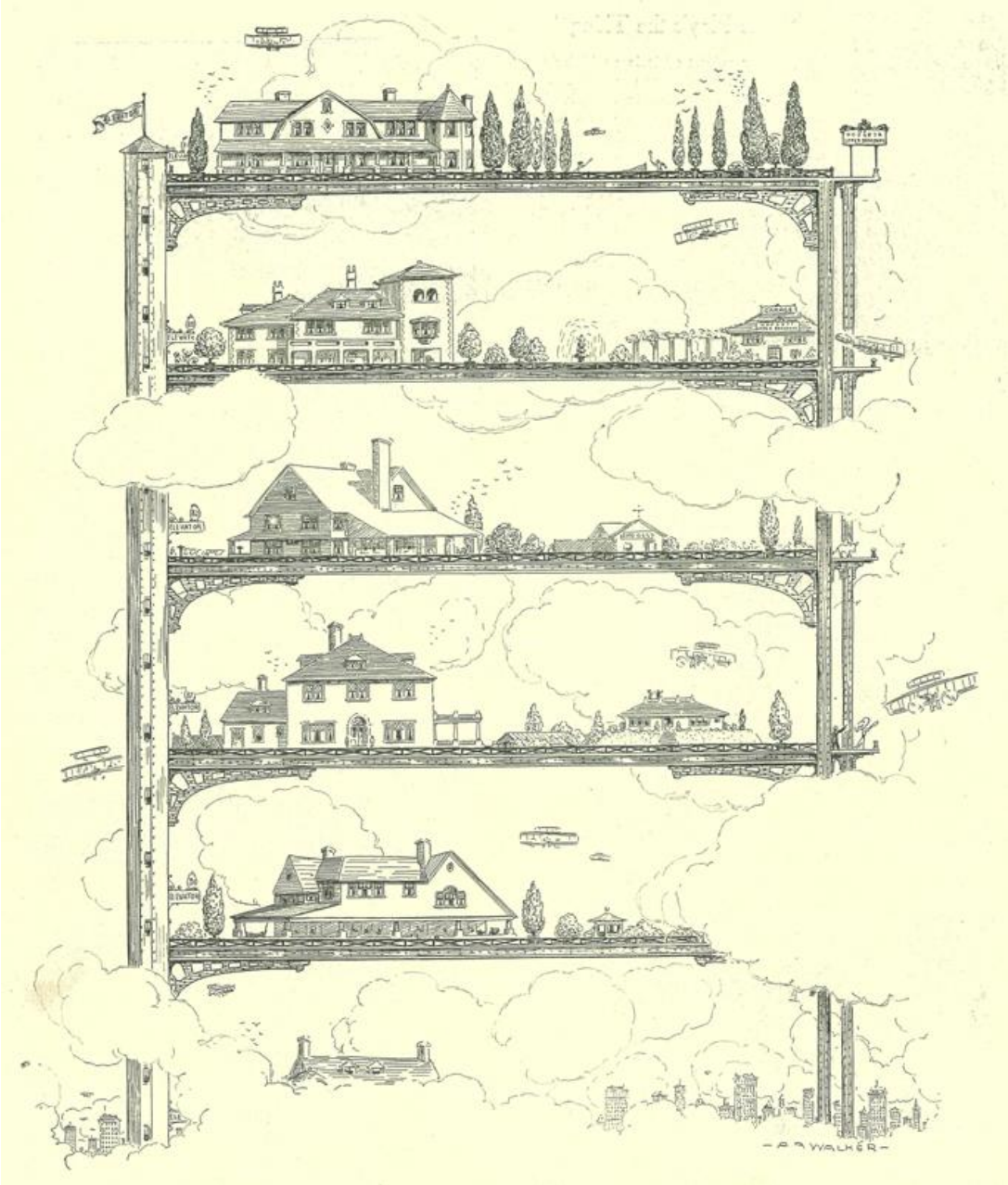
Figure 3.15 : Globe Tower (1909 theorem), 1909
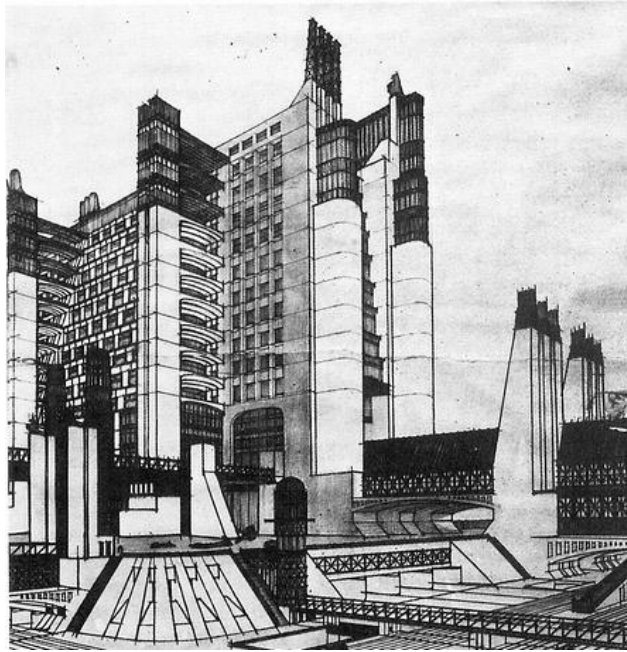
Figure 3.16 : Perspective drawing from La Cittá Nuova, Antonio Sant'Elia, 1914

Figure 3.17 : Drawing for Friedrichstrasse Skyscraper, Mies Van Der Rohe, 1921
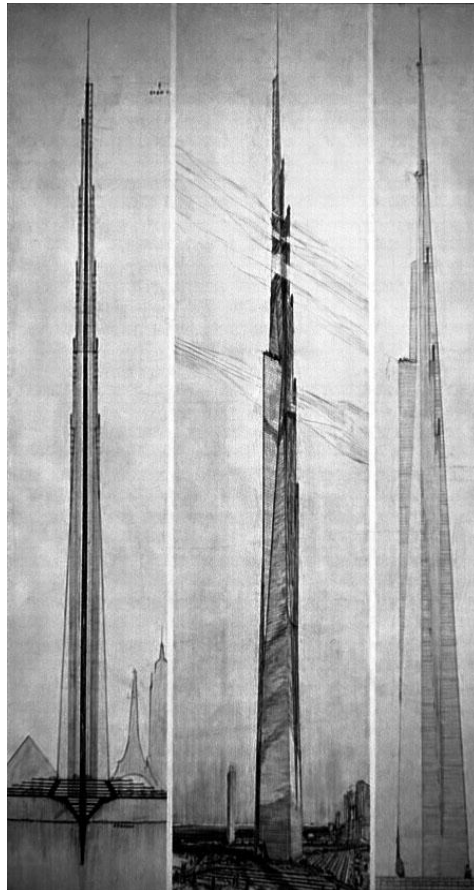
Figure 3.18 : Drawing for One-Mile-High Skyscraper, Frank Lloyd Wright

As mentioned earlier, Frank Lloyd Wright and Le Corbusier were designers of utopian projects of great influence on their successors as well. The utopian Broadacre City project by Wright was an urban planning project which also had social and political implications: each individual would own a vast plot of land and all transport outside those plots would be done via automobiles; decongestion would therefore be achieved and democracy realized. The project also intended to have a super tall building called One-Mile-High Skyscraper as its center; the skyscraper was a multi-functional structure of which the presentation was undoubtedly an attempt to visualize the inexhaustible potential of the future skyscraper, yet far from being realizable at the time (Lepik, 2008). On the other hand, Le Corbusier's La Ville Radieuse (The Radiant City) proposal for Paris anticipated a vast green area in the middle of the city which was to be populated by quite a high number of Cartesian skyscrapers housing business facilities and surrounded by lower housing blocks. The buildings were to be arranged in such a way that a certain distance would be preserved in order to allow sun light and fresh air in and outside, claiming to create a humane and livable green environment. The isolated high-rise buildings were also connected by elevated highways on which automobiles could shuttle from one

building to another instead of pedestrians over a green carpet: as Koolhaas put it, the culture of congestion created in New York was being destroyed by Le Corbusier's Radiant City which was equal to decongestion; the anti-Manhattan was being reestablished in Europe by Manhattan's very same constitutional elements, only in an unrecognizable way (Koolhaas, 1994). As utopian as Radiant City was because it dictated tall buildings as the key of a new life style system and as a modifier of the context in a historic and conservative city like Paris when there existed no real exigency for rising high in the air in Europe, the utopian characteristic of the project was also enhanced by the fact that it tried to legitimize itself by opposing a certain way the twentieth century skyscraper was being developed in a completely different part of the world, interestingly where it was actually born.

In 1960s when the metabolist movement was beginning to come along, high-rise buildings were to participate in this development as part of the organically growing city ideals. Among the Japanese architects of the metabolist movement, Arata Isozaki is renowned for his tall building projects such as the City in the Air (1960-1961), Clusters in the Air (1960-1962) and Marunouchi Project (1963). In the City in the Air project designed for Shinjuku district in Tokyo, cylindrical shafts rising high and containing infrastructural elements and elevators would be linked horizontally in the air through a flexible long span truss system which would house business spaces. The suggestion of the proposal was that only these growing forms interconnected to each other in the air would correspond to the urgent demand for novel architectural types for the metropolis. The joint-core system proposed for Shinjuku district was initially a proposal for residential architecture in urban areas positioning housing clusters over the existing city in the sky; the cores would establish the continuity of the urban fabric at the ground level and the newly forming structures. In The Clusters in the Air project the core shafts were metaphors of tree trunks and the high horizontal structures proliferating from them were their branches and leaves. As they grew they would form a forest where the branches would begin to intertwine. The application of The City in the Air series to Tokyo's main business district Marunouchi was also set out to study the potentialities of new spaces above existing city districts; the life on the ground level was supposed to be expanded to the elevated clusters in which business space would be reorganized (Isozaki, 1991). All of these projects departing from the conceptualization of similar ideas were important in terms of their newly forming perspectives to the urban development, and even if not constructed, they have been influential on architects and

architectural designs from all over the world in the creation of exemplary architecture and in the exploration of technical and spatial possibilities never experienced before.
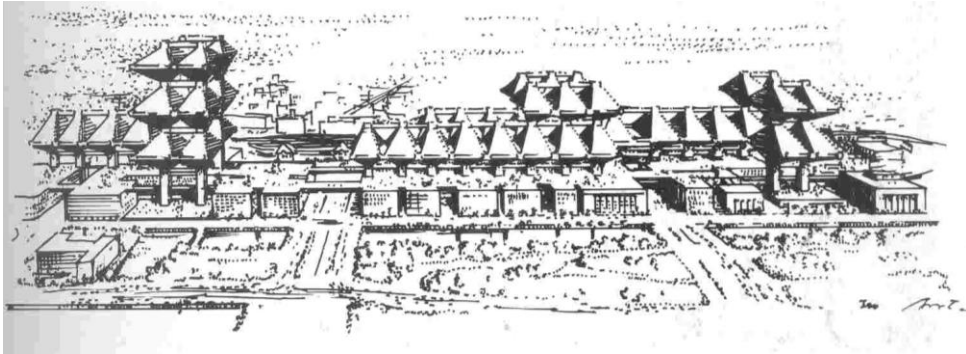
Figure 3.19 : Marunouchi Project, Arata Isozaki, 1963
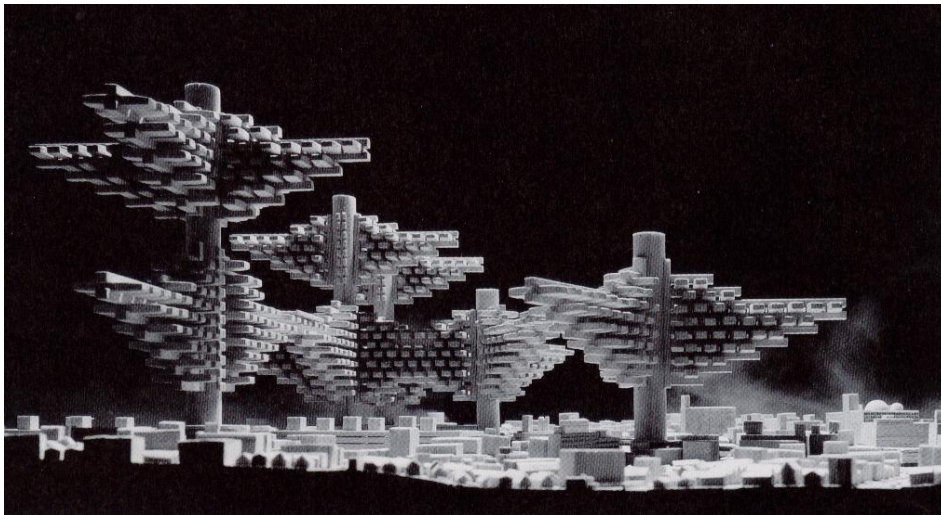
Figure 3.20 : Clusters in the Air, Arata Isozaki, 1960-1962

In order to give further examples, it would be adequate to mention the Sky City 1000 project designed in 1980s for Tokyo, an outstanding utopian proposal having high-rise as its key element. Sky City 1000 was a 1000 m high vertical community proposal. The concept was originated from the consideration of the idea that the demand for space on ground level could be met by the utilization of vertical space, and consequently there would be an increase in the amount of parkland of the city, leading to a comfortable and safe living environment for people instead of destructing the land with inorganic building materials. The proposal was a conical artificial city of gigantic scale. It would have used new materials, energy conservation systems, hi-tech construction methods such as the use of robots and unique transportation systems. The mega structure would be formed of fourteen layered plateaus of which each would have a large atrium in the center allowing natural lighting and ventilation, and around which a town would be built where

workers and residents would have lived in comfortable conditions and where various plants would grow. In order to avoid the negative effects of any problem that could occur on the entire structure which was planned as a self-sufficient city, each space plateau would be equipped with its own control system containing a water recycling system, a sewage purification plant, garbage incineration and fuel cells generating electricity and heat, resulting in a high ratio of energy conservation. In terms of transportation, different elevator types would run through the building, Sky Wagons would provide for the transport around the atriums, Sky Cabs would be available for individual transportation and Spiral Monorails would run on the exterior of the structure serving as a mass transportation means. The huge tower would be able to accommodate a great range of urban activities and demands, acting as an autonomous vertical city where a community of different people could live together; it would have hence created a concept that overcame a great number of the problems of the conventional cities (Hara et al., 1991). The Sky City 1000 proposal therefore claimed to be able to achieve an ideal order through the reorganization of the elements making up the city in a vertical layering system, and presented itself as a positive, or eutopian alternative in comparison to already existing urban formulations. Then again, the similarity of the project in terms of its fourteen levels acting as independent small sized cities to the utopian skyscraper image called as 1909 theorem by Koolhaas is not to be neglected.
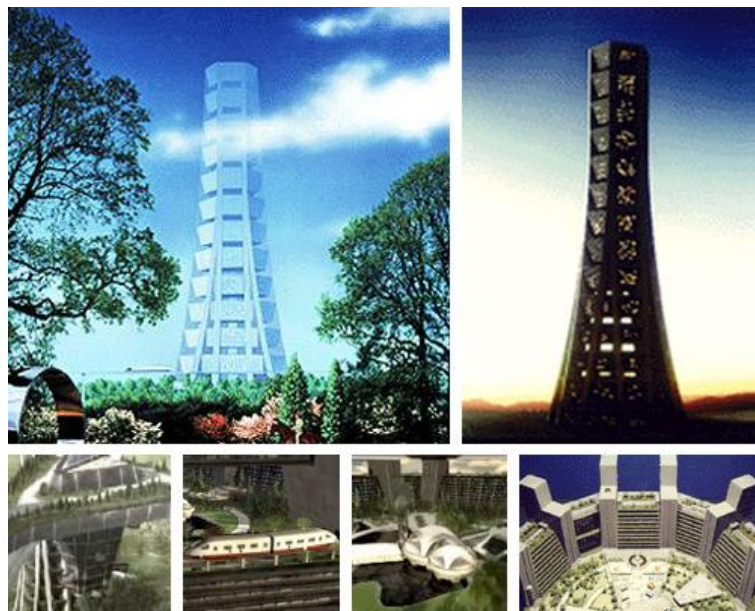
Figure 3.21 : Sky City 1000 proposal for Tokyo

As it can be affirmed form the previous examples, the concerns for designing utopian high-rise projects which were almost immediately begun by the emergence

of the nineteenth century skyscrapers continued with the same interest also in second half and end of the twentieth century. Actually it was the utopian potential of tall buildings that made the skyscraper which was an architectural structure firstly emerged in the United States as a combination of technological and particular socioeconomic conditions, a measure of success all over the world and a structure of legendary status (Lepik, 2008). Some of the most recent projects having utopian traits and aiming to become vertical cities are the Millennium Tower by Norman Foster & Partners which is anticipated to be a 840 m high conical structure located at 2 km distance from the Tokyo Bay and which would house 60000 people, the Burj Dubai project in Dubai which would claim to be the world's highest after its completion, and the Bionic Tower in Shanghai which would contain various activities such as hotels, residences, offices, hospitals and cinemas, and house about 100.000 people (Hasol, 2007).
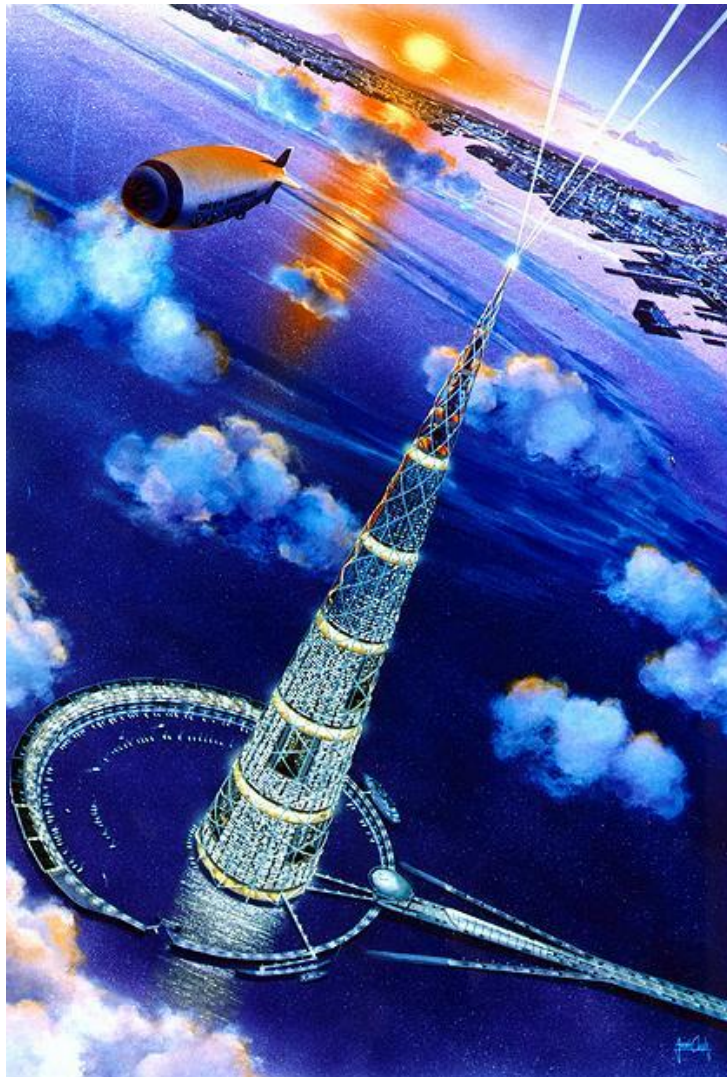
Figure 3.22 : Drawing for Millennium Tower proposal for Tokyo, Norman Foster, 1989

Figure 3.23 : Burj Dubai, Dubai
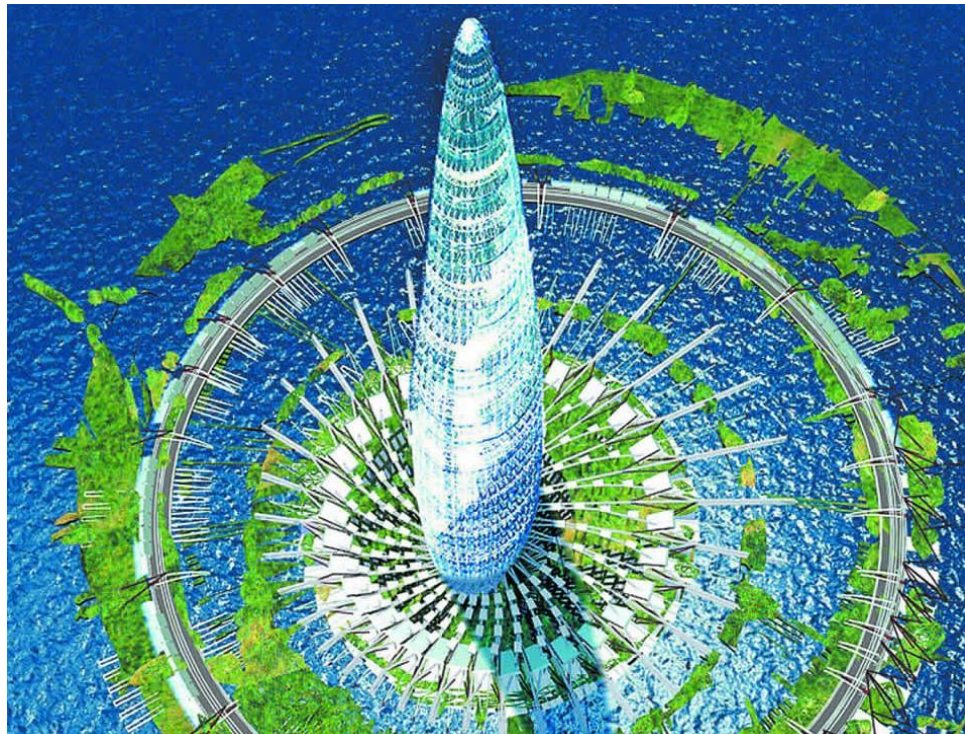
Figure 3.24 : Bionic Tower proposal for Shanghai

The common characteristic of all examples is not that they are all unrealizable or impossible no-places, but rather it is their visionary quality which gives way to the imagination and generation of unique architectural experiences and new attitudes towards what is conceived as the conventional way of being of architecture and humankind, along with a certain self-awareness. To mention the skyscrapers, even though urban planning issues and economic interests are commonly the primary reasons of their construction, their association with hopes, dreams and utopias has been the main factor leading them to aim for new heights beyond all rational considerations; skyscrapers have thus become a continuously renewable promise for the future architecture, representing its limitless possibilities (Lepik, 2008). Besides, it could be said that high-rise has always carried a utopian potential in its definition since it has symbolized humanity's conflict with natural and technological conditions and with people's settled opinions and prejudices, and furthermore that it has desired to stand out and communicate what is ideal. As symbols of major structural, architectural and economic achievement, tall buildings are able to offer people not only to momentarily enjoy dizzying heights, but also to work, live and coexist in a man-made environment high in the air, introducing themselves as an infinitely progressing and self-fulfilling utopia (Lepik, 2008). Again, just like Koolhaas states for the utopian 1909 skyscraper that it holds the promise of the conquest of the skyscraper by other cultural forms (Koolhaas, 1994), high-rise buildings in general, from the most conventional examples of the genre to the most extraordinary proposals, whether overtly or involuntarily, represent the achievement of alternative realities and the formulation of unlimited urban creation, adopting the beneficial aspect of the utopian thought, its generative character.

4. HIGH-RISE AS AN URBAN ECOSYSTEM PROPOSAL

As discussed in the previous chapters, high-rise has survived from the ancient times until the twenty-first century as a building typology which has often been quite controversial and it has manifested itself in several different ways and forms, serving a vast range of purposes. In any case, building high has always aroused great interest and been mostly criticized, whether positively or negatively. Considering the conceptual shift tall buildings have gone through in the course of their existence, twenty-first century appears as an important turning point, a period in which not only ecological issues and the consideration of multiple uses have come up as new matters shaping up the high-rise, but also conscious and greater efforts have begun to be made in order to acknowledge it as part of the cities and a prominent element of urban planning.

In light of the previous discussions, tall buildings seem to have consolidated their position among other building typologies making up the cities. Especially following the emergence of the concept of skyscraper, many progresses have been made in this field, and tall buildings are still very popular and apparently far from going through extinction. Indeed, the population and spatial intensity high-rise is capable of offering is inevitable, and the world turns out to be intensively urban, since cities and tall buildings bring about significant benefits over other sorts of settlement (Yeang, 2002). Consequently, as the world's metropolitan centers are getting more crowded and chaotic, high-rise has begun to get more acceptance and become a regular part of the everyday urban reality in order to handle this situation and to respond to the needs growing in parallel with the growth of the population and the cities. Hence the relationship between the tall buildings sprawling with an increasing rate and their context has also started to be very crucial, supposedly more than ever. Indeed, having likely a greater impact on its physical and social environment than low-rise or mid-rise buildings due to its size and height, the question how high-rise affects ecological patterns is of great importance (Ruchelman, 1988). Anyhow, it is also important to specify what the above mentioned context implies and includes, and where the ecological patterns Ruchelman speaks about stand in the context. Therefore, to understand this question and to further investigate its possible implications it is indispensable to have firstly a glimpse on the concepts of ecology and ecosystem, and moreover to associate them with the concept of urban

ecosystem which is the key to evaluate the relation of tall buildings with their surroundings. In addition to this, the questions whether the city may be an ecosystem, and whether the new generation high-rise may act as part of this ecosystem leading to new urban scenarios are the issues to be discussed in the forthcoming chapters.

4.1 Ecology, Ecosystem, and Urban Ecosystem

As a widely discussed issue of the twentieth and twenty-first centuries, ecology stands out as an important matter especially in terms of building and construction technologies since they are commonly accepted as one of the man's inventions with the most powerful and drastic effects on the environment. Ecology in turn, is closely associated with the term ecosystem, which is also affected by the man-made physical and social environment. To better visualize both terms, it would be suitable to go through their dictionary definitions and etymological roots in the first place.

To begin with ecology, it is defined in Merriam-Webster's Online Dictionary as:

> "1: a branch of science concerned with the interrelationship of organisms and their environments
>
> 2: the totality or pattern of relations between organisms and their environment" (Merriam-Webster's Online Dictionary, 2009).

In the Encyclopedia Britannica ecology refers to:

> "study of the relationships between organisms and their environment. Some of the most pressing problems in human affairs –expanding populations, food scarcities, environmental pollution including global warming, extinctions of plant and animal species, and all the attendant sociological and political problems- are to a great degree ecological.
>
> The word ecology was coined by the German zoologist Ernst Haeckel, who applied the term oekologie to the "relation of the animal both to its organic as well as its inorganic environment". The word comes from the Greek oikos, meaning "household", "home", or "place to live". Thus, ecology deals with the organism and its environment. The concept of environment includes both other organisms and physical surroundings" (Encyclopedia Britannica, 2009).

On the other hand, from another point of view, ecology could also be described as the investigation of systems which would be able to reduce the negative effects of the products on the environment all through their life cycles; it could be therefore stated to deal with the rational use of man's and nature's resources (Oral, 2007).

Ecosystem is another important term in close relation with ecology. Ecosystem is defined as:

> "the complex of a community of organisms and its environment functioning as an ecological unit" (Merriam-Webster Online Dictionary, 2009).

Or it is described as:

> "the complex living of organisms, their physical environment, and all their interrelationships in a particular unit of space" (Encyclopedia Britannica, 2009).

As it has been seen, the terms ecology and ecosystem have similar and somehow complementary meanings. While ecology points out the relation of living organisms to their environments, ecosystem appears as a more extensive term, comprising the entirety of the living and non-living entities working as a whole and their interrelationships.

Considering the built environment under the light of the ecology and ecosystem definitions, it clearly stands out as a very significant element of the ecosystem, with undeniable impacts on it. As the greatest need of man is the requirement for sheltering, the ecosystem is directly affected by the processes including the production, use and demolition of the buildings (Oral, 2007). It is primarily for this reason that the proper arrangement of the man-made environment is as equally crucial as the regulation and sustaining of nature and natural cycles, since it is their intertwined integrity that makes up the ecosystem. It should be therefore conceived that the creation of sustainable systems such as photovoltaic cells, wind turbines or water recycling are beneficial but not sufficient on their own to help the ecosystem maintain its balance, and the issue has to be handled in a much more extensive manner. Anyway, to provide for the continuity of nature and humankind and for man's innumerable demands all at once is aimed by man-made environment design in architecture; and at the same time, the consideration of design, construction, utilization and demolition phases of buildings in ways which would be harmless to ecosystems is aimed by the ecological approach to design (Oral, 2007). The idea is also supported by Ken Yeang, who sets forth the basic thesis that the whole lifestyle and the buildings which are its containers should evolve together in order to provide a framework of ecological principals for the society to live in (Richards, 1994).

The cities are large scale built environments where the man-made physical and social elements of everyday life prevail. They contain buildings, streets, squares, parks, green areas, and every kind of facilities which add up to form the urban areas in which the lives of a great part of the earth's population are carried on. As Yeang states, the cities are meeting places for people, working like frameworks holding together several institutions that make up the daily life; consequently, urban design provides for the need of public realm and event spaces like boulevards, plazas and

avenues to achieve a livable environment for the dwellers of the cities (Yeang, 2002). As permanent human settlements, cities are actually no less important than any other natural constituent of the ecosystem, and if closely examined, they can be thought of as smaller ecosystems on their own. Doxiadis defined the concept of city by considering it as the union of five major components. According to his approach, the elements forming the cities are nature which is the container, man who dwells in it, society created by man, the shells which are the buildings, and the networks such as the transportation and communication systems, power and water supplies (Doxiadis, 1966). The interconnection of all these elements makes up the city, which can be compared to a small size ecosystem in which it constitutes a complex community of social, physical, natural and artificial factors, which function all together to maintain the balance and unity of this self-enclosed system. Since cities are composed of interacting abiotic and biotic elements like any other ecosystem, and despite the fact that some of these components such as buildings, infrastructures, sporting grounds and parks are newly introduced but still fall within the abiotic and biotic categories, cities might be regarded as ecosystems in which humans live and interact with other living and non-living elements as well as with each other (Jennings & Newman, 2008).

Adopting the approach of handling the city as part of the ecosystem in general and in turn as an ecosystem on its own, the idea might be carried one step further by considering the constituents of the city not just as part of the city but as smaller size ecosystems as well. Amongst these many constituents, high-rise buildings stand out especially regarding the latest developments and advancements in the twentieth and twenty-first centuries. Tall buildings are in the very important stage of metamorphosing into a new generation high-rise conception, not only by virtue of ecological design approaches or mixed-use considerations, but also by the introduction of utopian projects proposing to handle the high-rise as self-sustaining systems full of potentials never thought of or explored in depth before. Visualizing the city as an ecosystem and tall buildings as its elements, and comparing them to an organism and to its organs, cells or whatever its components might be, it should be considered that the well-being of any organism is mostly due to proper functioning of all of its elements, and as a consequence this well-being could easily be threatened by the failure of any of them. High-rise buildings actually occupy quite an important place among those elements primarily because of their large size and of both their physical and functional location in the urban realm. Indeed, in the cities where the consequences of unlimited high-rise growth were not foreseen and the

street systems were not revised to correspond to the newcomer, high-rise has become an obstructing element (Saarinen, 1965). Nevertheless, the opposite may also be true if appropriate consideration and care is given to tall building design. High-rise design should be approached as an urban design proposition and not only as a building type design as cities and their residential and business districts become substantially denser, and tall buildings should be regarded as vertical extensions of the urban area, with internal, external and transitional spaces similar to many of those successful urban spaces of the cities; this is actually a new territory that needs critical consideration to provide for the needs of current and future users (Yeang, 2002). The issue is considerably important since twenty-first century cities suffer the consequences of overcondensation and in accordance with this situation high-rise buildings as urban ecosystem proposals are to be evaluated profoundly in the forthcoming chapter.

4.2 Assemblage of the New Generation High-rise into the City

4.2.1 High-rise as a vertical ecosystem

Since the twentieth century the world has witnessed a great burst of tall buildings in its metropolitan centers generally with little regard to the possible benefits or damages they might cause, and with greater interest to their numbers, height and grandiose appearances. The planning of high-rise buildings individually or in groups constituted picture material for professional magazines and books; anyway, although they often referred to the glorification of the machine age rather than being genuine aspirations for better homes, they were undoubtedly necessary for they gave rise to new ideas and progress (Saarinen, 1965).

Despite the increasingly dominant existence of tall buildings in the cities, before they can be fully integrated into the urban context, it is important to ensure their acceptance by the city dwellers. Indeed, the social acceptance of high-rise buildings is not completely achieved; the fact that they are often associated with intrigues in politics and business causes their development to be rather difficult in skeptical societies, and the responsibility of the civic administrators and politicians is to consult citizen groups and to assure that the developments are debated in detail (Lim, 1991). This situation is quite apparent especially in societies and countries where certain traditions of urban planning have prevailed for long periods of time. Furthermore, it is also understandable that tall buildings might seem like intruders of huge size that alter irreversibly and perhaps negatively the nature and order of low-rise or mid-rise cities where the majority of buildings are some hundred years old.

Though, the irritation tall buildings may cause has to be confronted in some way if tall buildings are to continue their existence. The financial capacity to provide for a tabula rasa and start again with resettled urban centers that consist of medium or low-rise buildings is not owned by most countries, moreover, to dispose the present investment of infrastructure would be wasting the resources if the existing urban centers were replaced (Yeang, 1994). The most intelligible approach therefore stands out as the consideration of high-rise buildings as active parts of the urban planning process in all of its phases, and as urban elements that do not stand against the existing order of cities but rather as its enhancers and fully integrated participants, since they always positively or negatively affect their environment. Talking about the skyscraper in particular, it could be said that the appearance, scale and concept of the cities, and their inhabitants' perceptions are entirely changed by it, and thus presently it is very crucial to get the architect and the builder to examine all the factors concerning the design of high-rise buildings along with their incorporation into their urban settings (Ritchie, 1988).

High-rise buildings are without doubt elements of the cities like many other elements. The important issue arises at some point where their integration at all levels -which is thought to be certainly necessary- begins to be considered. As discussed previously, approaching the city as an 'ecosystem', tall buildings are in continuous interaction with their surroundings, changing their context while at the same time receiving data from outside. Saarinen emphasizes the significance of flexibility and protection in the case of dynamic cities, and puts forth that every section of the city should be planned in such a way that the normal growth of the city should be ensured without disturbing other sections and the already established values should be protected (Saarinen, 1965). The case is also valid for the dynamically growing cities of the twenty-first century of which tall buildings constitute a substantial part. It is therefore at the very beginning of the design phase that the context of a high-rise building should be immediately examined and paid no less attention than the building itself. After all, it is the wholeness of the components of an urban area that makes it a city. A city in turn, is first of all a physical space and has to be evaluated in these terms. Doxiadis supplies that the relationship of any unit to the other is defined by the proper structuring of space; the proper interconnection of all cities to a national network, and of all nations to an international one is therefore important in order to guarantee easier and closer relationships that function well (Doxiadis, 1965). This is actually worth considering also in smaller scales, such as the importance of the interconnections of units like

the buildings to each other and to other units, which of course include tall buildings and at a more detailed degree, the smaller units that make them up. With the activities a high-rise building supplies the city and with its unique existence, it is, or at least it should be alive. Designing tall buildings as monuments should be avoided and their integration into the urban cityscape should be achieved, relating the vertical movement of the buildings to the horizontal movement at the street level (Ritchie, 1988). The important point that must not be missed is not that tall buildings may not be anymore appraised as esthetic or artistic objects with certain symbolic values -which, in most cases they certainly are- but that they currently bear additional responsibilities and express more than what they did in ancient times and even at the very first years of skyscraper design.

Figure 4.1 : World Trade Center Towers, Minoru Yamasaki, Emery Roth & Sons, 1966-1973

Considering the huge built content of the high-rise building, the design process would require great care in urbanistic terms, aiming to integrate its design within the already existing context in order to establish links with the surrounding systems and urban networks (Yeang, 2002). It would not be inappropriate to state that advanced technologies and the use of novel techniques have enabled architects and constructers to design with greater liberty and to go almost as high as the human mind can conceive, but it is also not rare that tall buildings are seen only as the achievements of these technologies that stand as bold and daring objects in certain districts or squares of the cities. For instance, 1970s are a period in which revolutionary features were used in the construction of skyscrapers, and interest was awakened in eloquent forms and references to the history of architecture,

however most of the tall buildings built in that era are criticized because of their deficiency in providing something that the public could identify with and because of their unsuccessful connections to their surroundings; some of those buildings would be the Twin Towers of the World Trade Center and the Sears Tower that despite their stunning height were sharply criticized for their monumentality, and the United Nations Plaza in New York, Westin Peachtree Plaza Hotel in Atlanta, and the IDS Center in Minneapolis that externally looked like well designed boxes but had no real connections to their urban settings (Lepik, 2008).

Figure 4.2 : Sears Tower, Skidmore, Owings & Merrill, 1970-1973

Figure 4.3 : Westin Peachtree Plaza Hotel, John Portman & Associates, 1976

Figure 4.4 : United Nations Plaza, Wallace Harrison, 1947-1952

Tall buildings occupy considerable space in the city; it could be said that one of the justifications for their existence is that they supply high numbers of square meters with relatively small ground floor areas, anyway, it should be also taken into consideration that they are only capable of doing this by increasing the amount of space in which they tend to grow vertically. They therefore affect the city not only by occupying parts of the streets at ground level, but additionally on series of other levels in which the impacts of several natural factors such as the wind and sun on

the city are altered by the existence of the high-rise building. It is expressed that the interests and values of the user and the client as well as those of the society should be taken into account in decision making in the design process since the function of high-rise as a modifier of climate, culture, behavior, resources and urban environment is the concern of these decisions (Edwards, 1988). Like other buildings, high-rise thus affects and modifies its context, but possibly at a greater degree. This is a prominent reason for which tall buildings should act like integrated parts of the city, or metaphorically as fully functional organs of an organism. The need to deal with the insular, autonomous and freestanding character of the high-rise building type in order to allow it to become a participant in the formation of collective spaces and to promote it into a more civilized and social state appears as a central task of architecture (Pedersen, 1988).

As emphasized previously, tall buildings occupy very large internal and external areas which actually amount to large portions of the city. As a consequence, the design endeavor does, or at least, should require proportionally careful attention. The urbanistic consequences that the substantial areal magnitude of an intensive building such as the high-rise induces is unfortunately ignored in the designs of most architects: generally, the design precedents misguide the designers into setting up the typical floor plan of the building as a standard at first, and then extruding and repeating it through its entire height; afterwards, when the typical technical issues such as the place of elevator cores or the riser duct locations are solved, the attention gets directed to the façade or other engineering aspects occasionally with small variations in the overall design (Yeang, 2002). In such a design approach, even though the internal configuration may function properly, the result is commonly a set of tall buildings not well associated with their surroundings and with the public. In the ordinary urban design process, buildings are commonly evaluated as entities disconnected from each other and from other components and networks of the city such as squares, streets and other types of open spaces, and the decisions concerning the urban growth are made without considering the three-dimensional relationships between the urban spaces and the buildings, leading to the emergence of vacant and unshaped spaces in the urban fabric; accordingly, the thought anticipating the provision of wider areas around tall buildings as they grow higher is responsible for the transformation of cities into the agglomeration of unrelated high-rise buildings encircled by these meaningless vacant spaces (Çakmaklı, 1992). This thought might address tall buildings with certainly good intentions such as enabling the proper ventilation and solar gain of the streets and buildings around them,

however what is ignored in this approach is that the functioning of the urban realm is definitely dependent upon the functioning of all the interrelated components of the city. In accordance with this, the role of high-rise is crucial because of its size, function and location. In any case, its design comprises also what happens outside it as much as it does what is inside since the space and activities around the building are affected by it and vice versa; and those indoor and outdoor, public and private activities and spaces add up to constitute the three-dimensional cityscape (Edwards, 1988).

The cities of the twenty-first century are very intense by nature, which is also one of the reasons of the emergence of tall building typologies the cities are presently crowded with. Because of their capacity to accommodate various functions all together and considerable amounts of people, they give rise to areas of intensification in the city, which, if arranged in the right way would enable successful functioning of all the elements of the city connected to those areas, or if not, would cause serious damage and obstruction. Considering the compact urban areas in a positive way, the intensification of cities also means the intensification of urban social, economic and cultural activities along with social, environmental and sustainability benefits that concentrating the urban functions brings about; consequently, residential uses are enabled to be located close to the centers and the residents are provided with easy access to various urban amenities (Yeang, 2002). Conversely, non-proper arrangement of high-rise buildings in the city may lead to a corrupted city silhouette and malfunctioning urban areas. Indeed, how it would be possible to maintain the continuity of squares and streets that have orientating features in urban areas consisting of vertical masses surrounded with unshaped spaces devoid of physical elements delineating their limits is one of the most important problems that has arisen with the introduction of tall buildings in the cities (Çakmaklı, 1992).

In accordance with the points made so far, it can be deduced that the consideration of tall buildings as elements providing urban continuity is immensely required by the cities of the twenty-first century. Regarding high-rise as a proposition for urban design and not only as the architectural design of a building type in the cities where residential and business districts are becoming considerably denser, strengthens the idea that tall buildings should be approached as vertical extensions of the city and their design should be handled in more inclusive and complex terms (Yeang, 2002). On the other hand, to consider high-rise as only and basically a building typology would be another approach. Anyhow, even if regarded simply as a building,

it would not be possible to define it independently from its context. Buildings may be said to be somehow more satisfactory than they were in their earlier periods in terms of their internal functioning, however this would be valid only inside them: as they create more pleasant inner spaces than the public space they tend to isolate people from their natural surroundings and to enclose them causing not a natural but mechanical connection with the world outside (Doxiadis, 1966). This statement turns out to be quite apt especially for tall buildings, as the greater care is generally given to the design of internal spaces in order to create a physically and psychologically comfortable and pleasant atmosphere, and to the façade design as a completely separate issue from the internal organization, and the relationship to the outer world is only considered at the ground floor level where weak connections are tried to be established via public amenities such as restaurants, cafés, several stores and commonly unsuccessful squares.

Cities function as ecosystems where the unity and accord of the components and networks provide for their maintenance. Systems such as drainage, water and power supply, waste disposal, transport and telecommunications are among the city-life support systems, and they impact on the urban activities as well as on the urban structure; similarly, these urban infrastructures might be compared to the infrastructure of high-rise which needs to be designed in a manner that enables growth and change (Yeang, 2002). Adopting the approach that the city works as a self-sufficient ecosystem, there is no real obstacle in accepting tall buildings as its vertical extensions, and in turn as smaller ecosystems which are also self-sufficient and capable of maintaining their own equilibrium, while at the same time contributing to the sustenance of the city as a whole. High-rise should act in accordance with other practical and esthetic functions of the city, being a natural product of the overall urban planning, just as a healthy organ would behave in a healthy organism (Saarinen, 1965). Surely, the consideration of high-rise as a vertical ecosystem includes the definition of ecosystem in all aspects, and points out the consideration of all the technical and physical issues which would provide for its sustenance, as well as the social interaction networks and patterns. In order to design sustainable urban areas, the limitations of the ecological environment should be addressed by tall buildings, and their design conception should shift from designing high energy polluting systems to designing mimetic ecosystems endowed by the capacities of natural ecosystems in the biosphere, of which the operations, inputs and outputs are related within the context; ultimately, this would mean the utilization of renewable elements, and of residuals and discharges of the urban system which would be

converted through recycling and reused as inputs beneficial for the city (Yeang, 2002). A vertical city example relating to its surroundings through ecological means would be the 60 storey JB 2005: The Bioclimatic City tower by Yeang which reacts to its environmental changes to maintain its homeostasis through sun-shading devices and through canopy like structures channeling the wind to provide fresh air, and additionally by vegetated walls, roofs and plazas which form further recreation spaces while contributing to the cooling of the structures of the city (Hamzah & Yeang, 1994). Then again, the balancing and functioning of social networks is as equally important, and benefits from the proper arrangement of the physical environment. Spaces with healthy and successful environmental conditions result in healthier people, whether physically or psychologically, and this, in turn supports a more balanced city life.
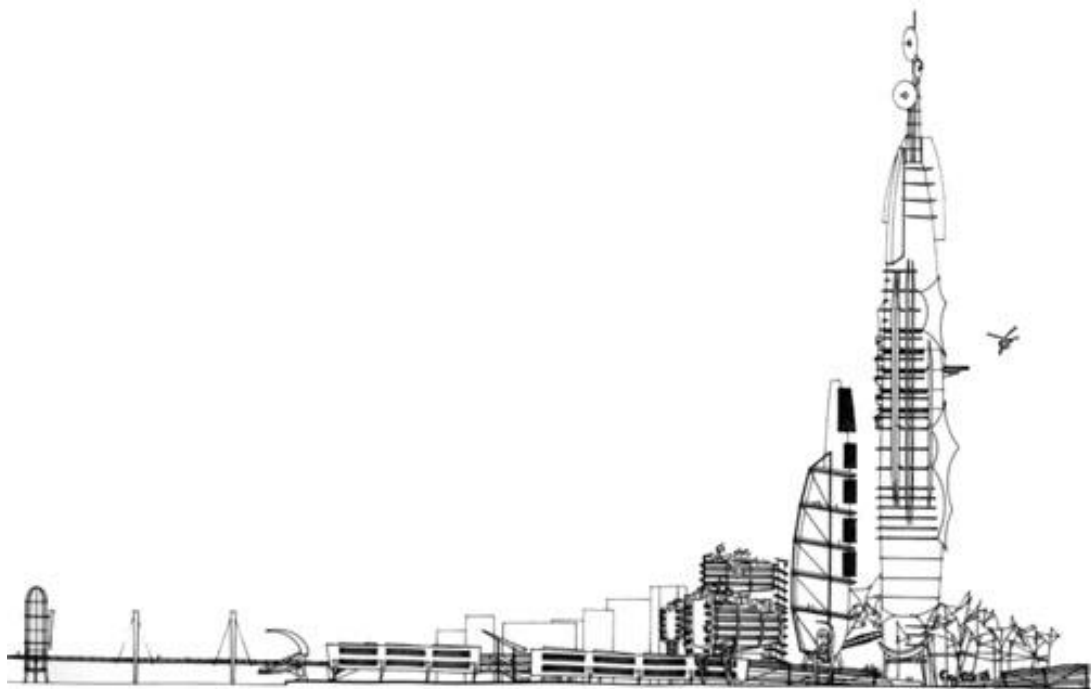
Figure 4.5 : Drawing for the Bioclimatic City, Ken Yeang

One of the reasons for accepting the city and high-rise as mimetic ecosystems of different size would be regarding humans as part of various ecosystems. Humans are included in every ecosystem in the world, or at least their actions influence all of them, in return, they and their institutions are affected by the ecosystems in which humans function; consequently, using ecosystems as a model that brings the social and environmental concerns together can give direction to transforming the urban form, as well as reestablishing the capability of urban bioregions to operate sustainably (Jennings & Newman, 2008). Indeed, cities and buildings, and many

other components forming them are creations of humankind in the first place -which can be said to be artificial in this sense- but conversely, humans are part of the natural environment -in other words natural outputs of the ecosystem- and they construct and shape parts of the Earth surface to create cities and shells to live in, and the facilities included in them, which would supply the demands of their civilizations, working as extensions of the natural ecosystems. In this case, it would be indispensable to reinterpret every element of the built environment, attributing them new meanings and regarding them from new perspectives: as a whole of which the functioning is to a great extent dependent upon the functioning of all of its components in accord, and upon the establishment of suitable interconnections and relations between them and the other elements of the ecosystem.

As it has been discussed, tall buildings undoubtedly impact their environments through their physical existence as well as the activities and functions they house, which is one of the primary reasons for which they should be regarded as vertical ecosystems. It was not until the last decades of the twentieth century that several other functions were added to the common use of high-rise for business purposes. Nevertheless, high-rise buildings are still widely used for the very same function, serving as office buildings of considerable size. The consequence this situation leads to is quite predictable. As buildings of great influence on the cities, dramatic differences occur in the population of tall office buildings during the working and non-working hours, to which the Sears Tower in Chicago might constitute an example with a population around 40.000 people during the work time, and with no population at all after those hours (Özer, 1992). As a result, especially cities with concentrated business districts constituted of tall office buildings suffer an excessive accumulation of people resulting in congestion on the networks of the city in certain hours, and for the rest of the day almost completely unoccupied spots are formed on the city texture, causing spatial and temporal discontinuity.

The problem in many high-rise cases is largely due to the lack of relationships between the buildings and the urban realm surrounding them, which is again the consequence of a design phase that considers high-rise apart form its context, paying no or little attention to provide for the continuity of the street level life through the buildings. Therefore, a secondary architecture which would become part of the whole instead of being the sum of isolated objects prescribing the order of residual spaces is required to be designed in order to form urban realms in the built form of the high-rise; and public spaces such as sky courts, open lobbies, sky gardens, communal areas should be produced within the building, giving its inhabitants the

right to access these public spaces (Yeang, 2002). If tall buildings are to be seen as extensions of the urban ecosystem, and ecosystems on their own, the communication with their surroundings with greater efficiency is directly affected by successful internal communication and spatial arrangement. In traditional high-rise design generally a typical floor plan is repeated through the height of the building where only small alterations occur in some of the floors such as the ground or roof floors where activities different from the main function of the building are introduced; very often, horizontal circulation in different levels of the high-rise does not relate well to vertical circulation means, and they act as separate systems. Similarly, vertical circulation remains as a set of staircase and elevator cores which don't give the users any clue of moving through the high-rise, breaking again the temporal and spatial continuity. However, the issue has begun to be handled more carefully in the design of the twenty-first century tall buildings in order to enhance vertical communication and provide for the efficient use of all the areas of high-rise. As users prefer not to walk long distances, planning the circulation through and around the cores, and avoiding the restriction of vertical communication to elevator access, by the creation of voids enabling visual access, shuttle elevators or internal staircases are becoming of great importance (Crone, 1991). Approaching tall buildings as urban ecosystem extensions also enables the consideration of the circulation networks of high-rise as an analogy of those of the city. For instance, the elevator system of high-rise might be compared to the subway system of the city and mapped in a similar way: as the built form of a tall building becomes more complex, its vertical circulation stops reflect more the condition of underground station stops (Yeang, 2002). Accordingly, not only the underground transport of a city, but also its other transportation networks may provide models for designing the circulation systems of high-rise. The points and nodes with well regulated people flow, those with congestion, and those where several systems cross each other to form certain hubs are to be examined in order to supply information on enabling successful vertical and horizontal communication through high-rise, and also on the networks entering it and departing from it, enabling additionally a successful communication with its context.

Although engineering and technology have developed and become more sophisticated, high-rise architecture has essentially remained unchanged in built configuration, not moving away much from the series of homogeneously stacked floor plates over each other: the consequence has been an alienating form of tall building for its users, seeking only to satisfy the financial interests of the real estate

developer by optimizing net-to-gross areal ratios (Yeang, 2002). Anyway, considering the real needs of the inhabitants of tall buildings and of those who may use them at varying frequencies, it can be seen that it is required to handle high-rise three-dimensionally, and relate all the spatial arrangements to each other in such a way that the texture and the construct of the city -which was formed almost naturally and sporadically in ancient times, and afterwards via urban planning which mostly reinterprets these happenings- are repeated through the building. This turns out to be extremely important since urban planning firstly regards the ordering and layering of spatial hierarchies of public, private, and in-between spaces in order to optimize the efficient use of the urban realm. In accordance with this, as a crucial step in the assemblage of the high-rise into the city, the application of similar principles of urban planning to the design of tall buildings is of increasing concern.

Producing public areas into the high-rise, and integrating them with the already existing ones would be a first step. For instance, Şener and Kahvecioğlu assert that introducing public spaces which have transitional space qualities between the functional areas of high-rise and urban space would be beneficial in terms of spatial psychology as well as corresponding to the psychological demands of people in need of integration with their environments (Şener & Kahvecioğlu, 1992). Anyway, even a more successful relationship might be established by considering that these transitional spaces might become in turn very efficient functional spaces which are constantly used by people and which provide for the continuity of life around and through the building. Indeed, in a truly integrated high-rise it would not be appropriate to make a division between functional and non-functional areas, but all of them should be considered as functional elements of a whole. In order to create a new internal life and thereby a new architecture of high-rise, the historical typologies such as the quarters, streets and squares existent in traditional cities could be reinterpreted and thence reconstructed in tall buildings; and a vertical city, or city within city concept might be modeled, integrating urban life with all of its functions within the tower (Yeang, 2002). On the other hand, providing only the ground floor of high-rise with functions which can be found in every street, and not allowing those to enter the upper levels would be another approach that would only partially work and would not be sufficient in the integration of the whole since this would require the introduction of various public, private and in-between spaces from the bottom to the very top of the high-rise. After all, the city itself functions well only if these various components work in accord. Houston and Rome are two examples compared in these terms: in Houston, buildings stand as insular figures with no recognition of the

streets or surrounding buildings with which they are supposed to create an urban context, and the need for traditional forms of collective realm such as the streets or squares is unrecognized; but on the other hand, taking Rome as a model for traditional cities, public spaces stand out as a substance to be shaped along with buildings, as these purposefully create exterior rooms while at the same time forming an inhabitable poché behind their façades (Pedersen, 1988). The approach of applying certain urban planning principles to the design of high-rise buildings is therefore acceptable since they can give important clues on the integration of the building into its context. A remarkable study is made by Ken Yeang, who chose the cities of London, Paris and New York as examples of which the urban arrangements might be capable of orienting the spatial arrangements and design of tall buildings, which he put forth as diagrams in the figures 4.6, 4.7, and 4.8.
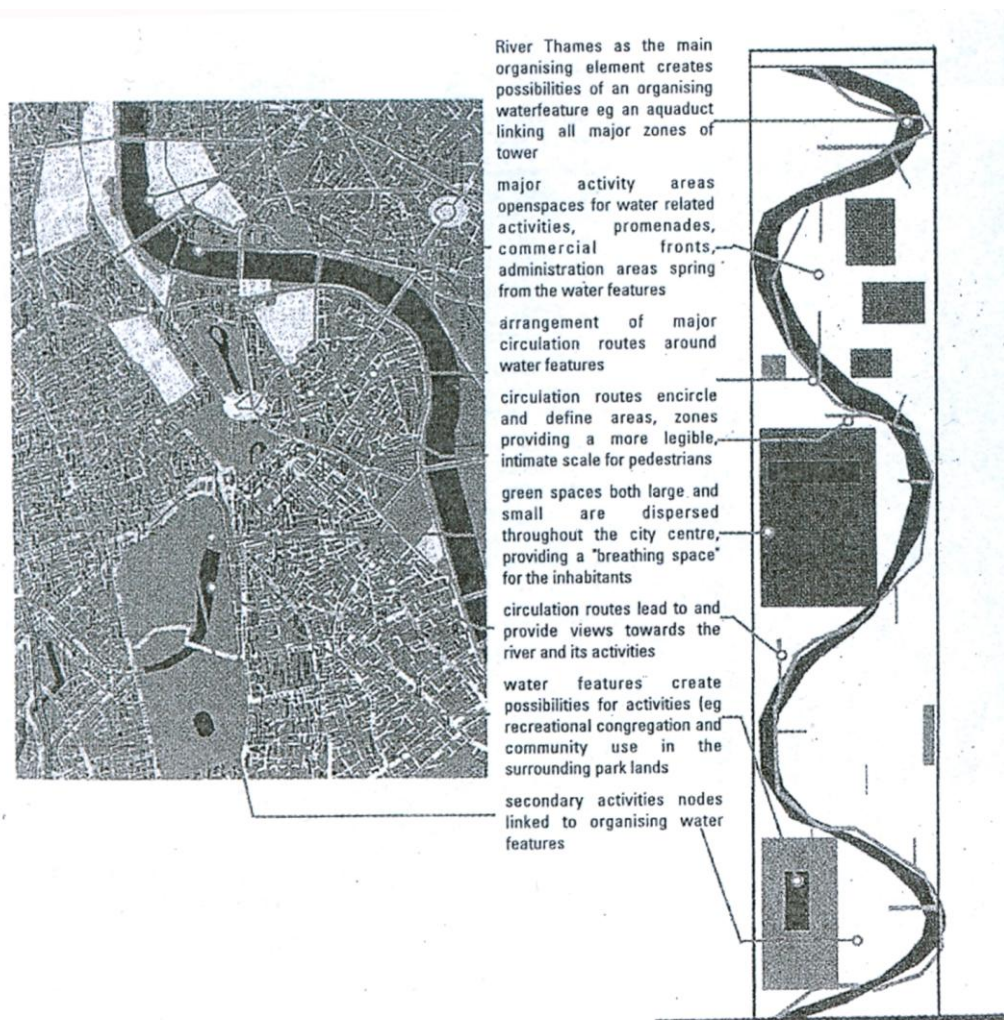
The 'London' Skyscraper

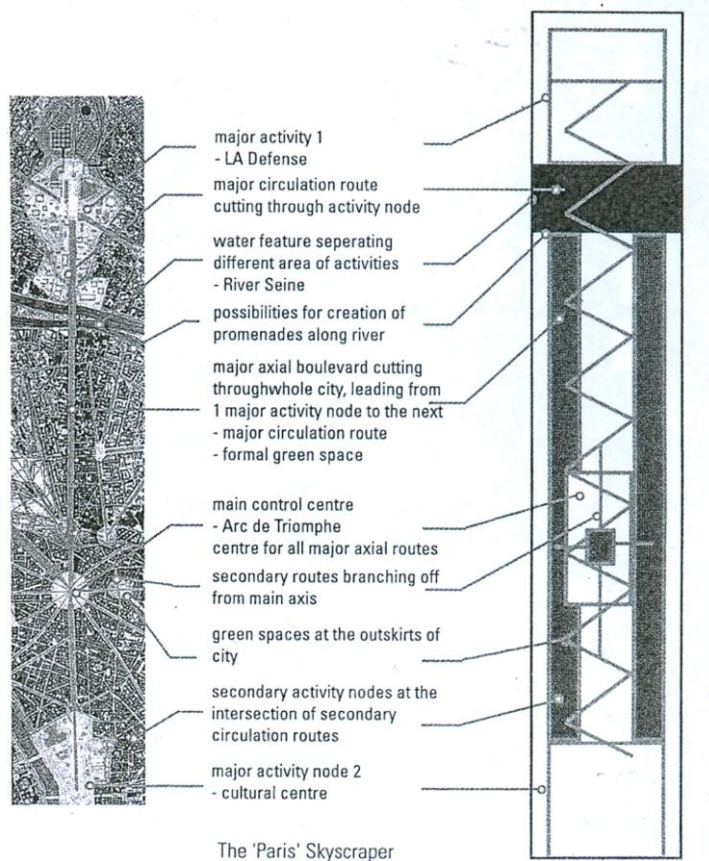**Figure 4.6 :** London Skyscraper diagram, Ken Yeang

The 'Paris' Skyscraper

Figure 4.7 : Paris Skyscraper diagram, Ken Yeang
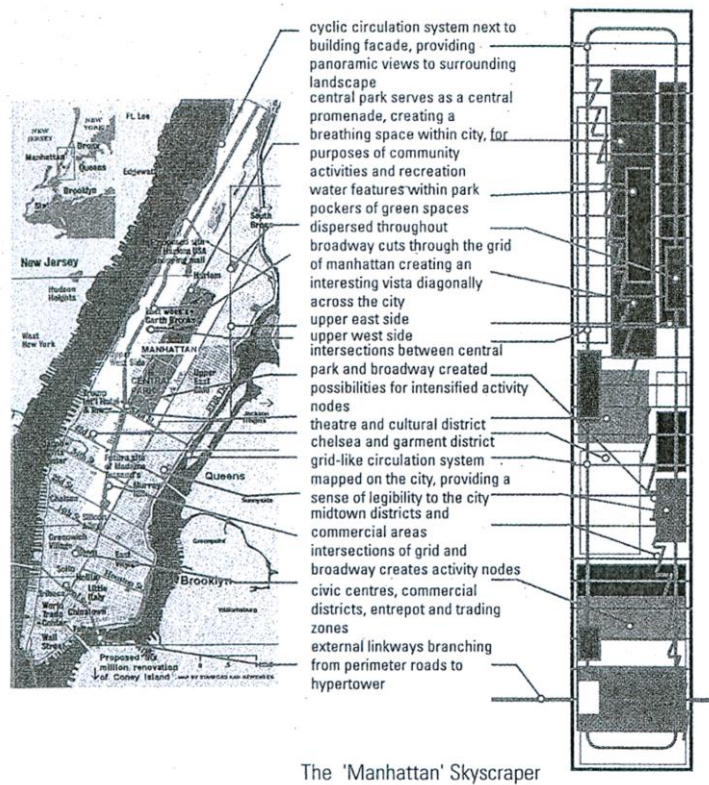

The 'Manhattan' Skyscraper

Figure 4.8 : Manhattan Skyscraper diagram, Ken Yeang

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Accepting the premise that the city functions as an ecosystem, and tall buildings as cities within the city, or ecosystems within the ecosystem, two examples would be beneficial in conceptualizing high-rise design as a vertical urban extension. Expo 2005 Nagoya Hyper-Tower is the result of a vertical masterplan which is generated by the principles of preserving the majority of the existing ecology of the locality and vertical accessibility. Different transportation networks -such as a LRT system, inter-area elevators, local elevators, district elevators, and a monorail system circulating around the tower- intersect in order to create activity nodes, and to supply multiple uses such as auditoria, police stations, a convention hall, cultural institutions, administrative offices, residential accommodations, light industrial premises and commercial spaces. In addition, the building is integrated into the natural environment through the use of vegetation as a part of the façade system providing microclimate control and shading, by installing tall trees and local plants that articulate double-volume spaces and give a sense of place, and by the introduction of open spaces including thematic gardens, promenades, roof gardens, planted terraces and a ramp park. The tower is envisaged as a megastructure, and each of the fifty segments that it is divided into is twelve meters high and capable of accommodating 3-4 storey buildings. Another example, the BATC Tower, is again a high-rise project with landscaped places throughout the tower, which are related to transportation and distribution networks. The building accommodates multiple functions, and open space systems such as sky courts, sky plazas and terraces. The tower planned to be integrated into its context including a series of high-rise buildings as parts of a masterplan proposal for the Universiti Teknologi Malaysia, incorporates experimental features in order to develop a microcosm of the city like the Expo 2005 tower (Powell, 1999). Both projects aim to create a high-rise setting which despite being man made acts as the continuation of both the natural and artificial environment being the existing ecological circumstances and the man made urban fabric. Aspiring to establish mimetic ecosystems high in the sky which work as self-sufficient systems prescribing certain life style scenarios, they might be said to constitute an extension of utopian thought, and reach far beyond the traditional approach limiting the high-rise to monumental and symbolic tall buildings or to insular and autonomous office skyscrapers. For instance, the traits of utopian 1909 theorem Rem Koolhaas speaks about in Delirious New York, or those of the utopian Sky City 2000 project mentioned in previous chapters can be immediately recognized especially in Expo 2005 Nagoya Hyper-Tower. But additionally, they also go one step further, going beyond the utopian thought, and opening up its closed, self-sufficient and ordinarily static system character to form new orders that respect

the already existing ones and that try to provide full integration by establishing dynamic bonds with their surroundings.
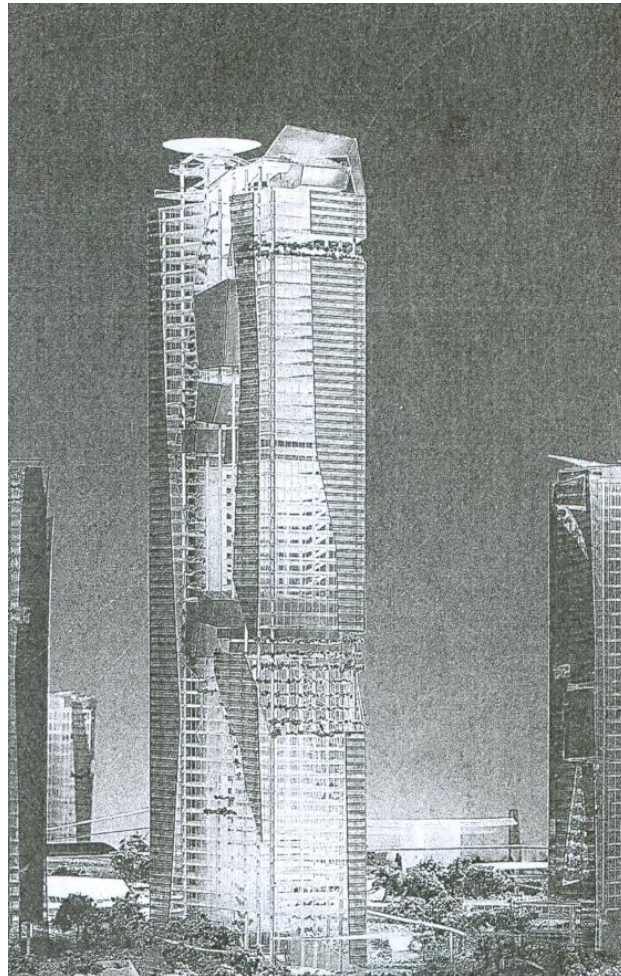
Figure 4.9 : BATC Tower, Ken Yeang

4.2.2 New life styles

Since their first appearance, cities have evolved and transformed as their dwellers developed civilizations one after another. A series of advancements and events in the history have led some of the world's cities to finally turn into chaotic and crowded metropolises of the twenty-first century. The static settlements have begun to transform into dynamic ones growing continuously as they have been influenced by new forces; they have merged with each other, absorbed the smaller ones, and grown into metropolises and megalopolises gradually (Doxiadis, 1966). These changes were of course dependent upon the advancing technologies and developing knowledge of humankind, which gained increasing momentum during the twentieth century. Thus, the transition of the developed countries in particular from the industrial society to the service and information society successively, and

finally to the knowledge society at the beginning of the twenty-first century was realized (Moser, 1991).

The nature of the cities was affected by the course of transition to the knowledge society. As social patterns such as living, working and interacting with each other changed, urban patterns also had to change, reconciling with them in order to fulfill the needs of a new type of society. Especially from the second half of the twentieth century on, urban planning has gone into an identity crisis: megalopolises and the so called centers have sprung up in many locations, real estate developments have lost scale and regional identity assuming a global one, and multifunctional patterns have become important, causing a major shift in urban development (Ábalos & Herreros, 2003). The social patterns influencing the change of the cities were in turn largely affected by the development of new technologies; especially the progress made in communication and transportation technologies constituted the most significant domain. A number of new conditions have emerged due to the revolutionary changes in the intercommunication of thoughts and people, and to the invention of various kinds of means enabling fast interchange of ideas as well as fast traveling, which naturally resulted in demand for new forms and developments (Saarinen, 1965). Indeed, new ways of traveling and communicating replaced the old ones: for instance, as underground transportation and air transportation became widespread, cities were provided with complex subway systems and airports; similarly, as computers and internet became more popular and cheaper than telephones, or easier to reach than libraries, information became much more accessible and free to travel around the world in strikingly short periods of time, leading to an increased interaction and interchange of people, ideas, information and culture globally. But from another point of view, the increased use of advanced telecommunication and travelling means as cities grow larger might also result in greater distances between people, in less social and personal contacts, and in less privacy (Doxiadis, 1966). It is no coincidence that while life acquires a faster pace since every action has to be accomplished as fast as possible in order to cope with the growing demands of condensed populations, people's social circles seem to be enlarged quantitatively but reduced in quality, and personal bonds seem to weaken and eventually break completely, causing isolated and alienated individuals who are seemingly provided with the best services and possibilities technology offers them. Therefore the role of these contacts in the creation of the society and civilization is not to be underestimated in order to understand, explain, and examine the newly

developing urban patterns, but it should be considered that they might also have negative consequences besides the positive ones.

Compared to the eras of the pre-industrial and industrial societies, the need for physical human work force is vanishing rapidly. Instead, knowledge turns into a matter of primary importance and value. It is estimated that in the twenty-first century industrial production will require a drastically decreased work force, and human labor will be limited only to the product design phase and to the computerized management of work (Moser, 1991). Urban areas are hence affected by the changing nature of labors, since as one of the simplest consequences it may result into the obsolescence of certain building types and introduction of new ones. Urban design needs to take into consideration factors such as privacy, gender, accessibility, defense and territory; but additionally, it is a requirement of the design endeavor to include the needs of communities becoming digitalized and of the cities becoming hence antispatial (Yeang, 2002). The urban realm now also comprises non-physical space besides the physical one, and even though it is invisible, it has great capacity of impacting everyday urban life. As it is stated by Marshall McLuhan a non-Euclidian space concept develops besides the Euclidian space, and so man is now capable of connecting to a wider space than the one his natural physical environment allows him (Doxiadis, 1966).

Like the entire city that changes and adjusts itself to the ongoing changes in life styles in a natural course which generally expands over a not very short period of time, life in tall buildings also transforms gradually and simultaneously; as the buildings, all kinds of networks, public and private spaces of the city are dynamically redefined, a similar reaction to these changes is also given by the high-rise. This process is inevitable and necessary, particularly if tall buildings are to be considered as vertical extensions of the city. As a consequence, currently, people's conventional perceptions on living and working in high-rise environments in the city need to be redefined because of the population growth and increasing pressures of urbanization; and as some of the world's low or medium-rise cities such as London are turning into high-rise and high-density environments, the question of providing the users with adequate high-rise buildings capable of offering a satisfactory urban life in the sky is of crucial relevance (Yeang, 2002). These concerns undoubtedly address the creation of environments that are satisfactory in all terms, pointing out socially and psychologically adequate conditions as well as the physical ones, including the protection of nature and maintenance of ecological principles.

Considering the drastic change urban centers have gone through since the introduction of skyscrapers in the cities as a new high-rise building type quite different from its predecessors both in form and purpose, it would be appropriate to state that tall buildings act as modifiers of their context at varying degrees. In fact, high-rise has inevitably been shaped by the very same economic, social and political reasons shaping the cities from the industrial revolution until the emergence of the knowledge society. Anyway, this process has also inevitably been reversed as tall buildings have begun to alter their surroundings and the entire city in many aspects. During the course of its existence, high-rise has begun to be conceived as a phenomenon that condenses activities and of which the internal structure is the reflection of the modifications in the production system; it has turned into a key component of the transformation of the concept of the city and of related architectural theories because of its influence on the urban fabric, and thus it has become an experimental model serving to identify new principles and to determine whatever takes place in the city (Ábalos & Herreros, 2003). The transformation has therefore naturally converted to a reciprocal process: high-rise has affected the city life and people living in it, and at the same time people's new life styles have started to define the nature of life in tall buildings, causing the emergence of new typologies, for instance multi-use high-rise.

As it has been already discussed, factors such as the transition to the knowledge society succeeded by the changes in the nature of labor and production, technological and communicational advancements, digitalization, and therefore a quite invasive introduction of anti-spatial realms and utilities in people's everyday lives as indispensable elements, globalization leading to intermingled societies, cultures and perceptions, population growth and ecological concerns constitute the intertwined and most crucial elements shaping the cities and hence high-rise of the twenty-first century. In turn, Cooperman states that future high-rise habitats are expected to affect social interaction patterns as a reaction to the specialized labor patterns, separation of workplace and residence, modifications in household characteristics and family structure (1991). Actually, the process has already begun, and as commuting between work and home has started to require much more effort as cities got denser and larger, the proximity of residential areas to the workplace has assumed a growing significance. On the other hand, while the concept of home office was emerging as a reflection of the situation, people have had the opportunity to orient themselves to other activities. As people devoted increasingly more time to culture, leisure and education, a more mobile population which is able to proceed

freely from residences to other locations was formed (Yeang, 2002). These changes which are actually major modifications of the life style, also resulted in the rebirth of the skyscraper as a new high-rise building comprising multiple activities all at once, including residential use primarily, and constituting a one more time condensed form of urban realm within the city along with other factors discussed so far.

The self-sufficient mixed-use high-rise is well suited to sites detached from business centers, which are locations in association with the developing transportation infrastructures that contribute to the successful functioning of work and residential areas located nearby. These infrastructures act as places that sustain dense activities and establish a three-dimensional link between the city's transportation networks and the high-rise which appears as their extension. The whole situation may be exemplified by cities with dispersed centers such as Atlanta: the metropolis ranges over an area of a radius of about 18.5 miles, and the distinction between the center and periphery is ambiguous; undeveloped areas are alternated with mixed-use areas with high densities that support cultural, work-related and residential activities. Atlanta thus constitutes an urban model for postindustrial cities which are multi-centered and devoid of formal structure. The traditional perception of public space is also destroyed by this urban atomization as exterior space quit to be organized by a formal hierarchy as pointed by the modernist tall buildings or historical public space concepts, and has become designated to accommodate a mobilized and marginalized population. Being strictly of commercial character, both exterior and interior public spaces are now also more selective and provided with electronic surveillance equipments which determine to a certain degree the activities and behavior of the users and thus delineate the anthropological nature of public space at the end times of the twentieth century. (Ábalos & Herreros, 2003)

Shaped by the motivations and demands of the postindustrial knowledge society, new life styles in the high-rise environments may sometimes appear as dystopian scenarios, particularly in terms of control and surveillance causing the loss of privacy and individuality, and vulnerability of tall buildings to various perils: the terrorist attacks to the World Trade Center towers, Orwellian literature, and Huxley's Brave New World are among the previously mentioned examples. However, high-rise may also be capable of holding potential benefits that may lead towards utopian/eutopian scenarios rather than dystopian ones. In ideal situations, leisure, work and home can be vertically interwoven in one single tall building precinct through heterogeneous use of land, and new and closer links can be created between diverse components of urban life (Yeang, 2002). This presumption is

especially compatible with the needs of accelerating pace of life, enabling rapid intervention and participation of the user to everyday activities, and providing more leisure time that can be devoted to socializing, enhancing personal contacts, or individual activities, breaking the traditional work-home circle.

As a modifier of the context, high-rise is able to change the entire city whether it houses only a few tall buildings, or it is mainly formed by series of them. It alters the climate, transportation networks, public and private spaces, silhouette, economy, ecology, social and psychological patterns of cities, defining a new urbanism. Furthermore, its being part of the urban ecosystem, and its ability to function as a self-sufficient ecosystem within the microcosm of the city provides an additional advantage for the high-rise, making it a prominent and permanent urban component of the metropolis of the twenty-first century that retains certain potentials for redefining life styles and creating new scenarios, and for being redefined by them in continuous and dynamic interaction.

4.2.3 New generation high-rise

The metamorphosis of the perception of tall buildings since their first appearance has been discussed to a great extent. Having a closer look at the technological and conceptual developments in the last decades of the twentieth century, it could be affirmed that a new generation high-rise is in the process of emerging as a prominent architectural figure of the twenty-first century. Indeed, twenty-first century is a crossroads in the historic development of high-rise: tall buildings of the twenty-first century -of which the development cannot be sufficiently indicated by tall buildings of the twentieth century- are undergoing a re-modeling process in order to enable a complete adaptation to environmental and social demands of the urban context, which cannot be reduced to a simple response to technology or to a change of style; actually, it is the philosophy of high-rise that changes by the assignment of a role that is more than being only vertical accommodations for living and working (Lim, 1991). Additionally, the new generation high-rise is perhaps more utopian than ever, since it claims to be both a result of the changing nature of life and its modifier at the same time, and to constitute a self-sufficient universe on its own with specific rules and set-ups. The main deviation from the precedent utopian thought is that the systems of the new generation high-rise are self-sufficient, but not self-enclosed; instead, they are nurtured through the dynamic relationships they establish with the whole urban ecosystem -a fact that could be mentioned as the reason for which they

are closer to be eutopian rather than dystopian, trying to reveal all of the potentialities of the city as an ecosystem proposal.

The evident and remarkable conceptual shift occurring in the perception of high-rise is indicative of the changing life style scenarios. These necessarily result in physical and spatial reorganization of tall buildings as a whole. The future high-rise as an urban design is expected to become spatially decompartmentalised on the contrary to the spatial segregation in the contemporary tall buildings, designed to accommodate various land uses, open spaces, parks, public spaces in the upper parts, and to form a whole planned as neighborhoods and precincts with optimal accessibility instead of being constituted of floor plate stacks (Yeang, 2002). Actually, it is a quite common characteristic of the high-rise of the twentieth century to be consisting of similar floor plans repeating themselves from the bottom to the top; the same is equally valid for monotonous façade designs. The contrast between the appearance and interior space is emphasized especially in the international style tall buildings, and form and space seem to be stuck together instead of being melded, with an exterior containing no clue to the interior, and without any reflection of the tense and fragmented life style going on inside (Scuri, 1990). By a new generation of tall buildings, this situation is aimed to be reversed; the new generation high-rise seems to be primarily grounded on the principles of openness and accessibility which are required by the consideration of the high-rise as the vertical extension of urban space. The closed box formed tall buildings -whether they serve only business, or are mixed-use developments- transform their identity into more integrated components of the city that are not open to the street level life only on the ground floor, but in all levels. The design convenience that resulted in the internally unsatisfactory and spatially simplistic planning of the contemporary high-rise is therefore needed to be replaced with spaces in the sky which are capable of providing vitality and life quality that would make high-density living desirable, with attractive spaces to socialize and to live in (Yeang, 2002).

Beyond all other factors which would enable the acceptance of tall buildings as successful urban development proposals, humanization of high-rise is of primary importance. Since society depends upon proper interactions of its members, and as the number of actual links per person is reduced because of cities growing larger, it is required to establish the potential of greater amounts of actual contacts through high densities in the units that depend on people's natural movements (Doxiadis, 1966). This statement directly points out the importance of understanding the nature of human contacts and socializing patterns in order to supply the design of

appropriate urban contexts. Although it would not be possible to recreate the social and physical circumstances of the pre-industrial era, the reinterpretation of similar principles in order to revitalize and enhance social life in high-rise and high-density living environments could provide potential clues about the organization of the new generation high-rise. The success of future buildings is expected to be mostly determined by the way its users feel about using it; the heightened awareness that the satisfaction and enjoyment of all the users, and the efficiency of the work force is based on the fulfillment of all the aspects of man's nature -the provision of both what is needed in mechanical and functional terms, and what is required to make people feel satisfied within a building- points out the recognition of the fact that the humanization of tall buildings can be achieved by the development of a certain harmony between the needs of urban planning, user, developer and environmental issues all at once (Crone, 1991).

Being vertical urban proposals, new generation tall buildings may be anticipated to be complexes of considerable size that would alter their immediate surroundings to a great degree. Some of the suggestions by Ruchelman for promoting healthy physical and social high-rise environments would be:

- Organization of the overall planning suitably for the provision of both private and public demands of the population

- Determination of land use and spatial distributions by acknowledging users' symbolic attachments such as cultural and historical landmarks, and ecological factors such as skyline effects, views, open space

- Conservation and integration of old buildings with the new ones in order to avoid visual monotony and to maintain the architectural and historical characteristics of the community

- Provision of a mixture of various functions such as work, residence, shopping, entertainment to insure people's presence and activity both in private and public spaces in different hours of the day

- Consideration of the impacts of the buildings on the street such as congestion, wind currents, shadows

- Preservation and improvement of the variety of institutions such as hospitals, schools, day-care centers, recreation centers and transportation (Ruchelman, 1988).

The new generation tall buildings would therefore reflect all the aspirations and needs of the urban life of the twenty-first century at all levels, by adopting new perspectives. It is estimated that future high-rise buildings would be used by people relating to them positively, and would create stimulating environments enhancing user choices instead of trying to control users' behaviors; as a result, all aspects of human demands would be reflected by relating tall buildings both externally and internally to the urban context and culture they serve, by organizing internal spaces as urban areas of human scale, and by permitting visual access to areas beyond the work spaces (Crone, 1991).

Considering tall buildings as vertical and natural protrusions within the city in which daily life enters and continues, from Ken Yeang's point of view, a series of fundamental goals should be taken into account in the design process of the new generation high-rise to ensure sustainability:

- Conservation and provision of natural resources for both present and future human generations enabled by the efficient use of resources and land

- Making certain that the relationship between the natural and built environment is mutually enhanced and balanced

- Prevention and reduction of processes polluting ecosystems, and promotion of their regenerative capacity

- Encouraging developments that decrease social inequality

- Changing values, attitudes and behavior through greater participation in decision making and initiation of environmental improvements from local communities upwards (Yeang, 2002).

As discussed earlier, high-rise buildings are in a continuous phase of metamorphosis. In order to ensure the realization of the goals mentioned above, and to become a real and functional element of the ecosystem, tall buildings are in need of assembling themselves into the whole, and as a primary step, rendering their existence 'ecological'. It has been attempted by many architects to design high-rise buildings which physically fit into their context, and work as self-sufficient and sustainable ecological units in the urban realm, contributing to the functioning of the ecological life cycle of the biotic and abiotic urban elements. Empowered greatly by the recent progresses in technologies, these efforts mainly hold the potential and intention of creating organic-like, intelligent, and 'eco-friendly' high-rise systems out of a building typology which has been known as the most polluting, and energy and material consuming all through its historical existence.

A number of ecologically-responsive tall buildings emerge by the evaluation, interpretation and adaptation of basic ecological principals into the internal and external organization of high-rise. For instance, Hypergreen Tower project by Jacques Ferrier in association with Lafarge, is one of the recent ecological tall building proposals for Paris. It constitutes a model for environmentally responsible multi-use high-rise building, especially designed for the world's big metropolises. Hypergreen hosts apatments, shops, offices, green areas and other kind of activities present in urban life. Additionally, it legitimizes and establishes its own presence in a metropolis such as Paris through a certain set of ecological principals and precautions. To counteract the negative effects of the energy wasting building industry, the skeleton of Hypergreen is made of an external concrete network ensuring horizontal stability, resisting wind load, and permitting flexible internal design of floor layouts; moreover, wind turbines at the top of the building, the solar panels on the façades which add up to 3000 m², the earth cooling tubes that provide for the natural air-conditioning, and the internal purification plant that recycles water are responsible for the generation of about the 50 to 70% of the energy needed in the operation of the building, making Hypergreen a prototype for future urban planning (Wassenaar, 2006).

Figure 4.10 : Hypergreen Tower proposal for Paris

The Pearl River Tower estimated to be completed in 2010 in Guangzhou, China, has the claim to be the world's most energy-efficient high-rise building. It is a relevant example of high-performance tall office towers designed to fit into its context through energy-efficient, passive heating and ventilation systems, and which is capable of generating its own electrical energy by the use of wind turbins, photovoltaic cells and natural gas fuel cells, and of collecting and recycling rainwater. Many technologies which are compatible with the humid and hot climatic conditions of the region are responsible for the collection and maximum use of the energy present in the natural environment. The automation of the building accounts for the control of solar gain and for a high quality illumination through the adjustment of louvers that are in between the double skin façade in accordance with the intensity and angle of the sun. The passive ventilation system that takes the air in and regulates its humidity through the double skin façade provides for a 40% saving in comparison to traditional HVAC systems. All these systems are combined with other high-tech strategies used in the design and maintenance of the tower in order to achieve 'the zero energy tower' goal (Utkutuğ, 2007).
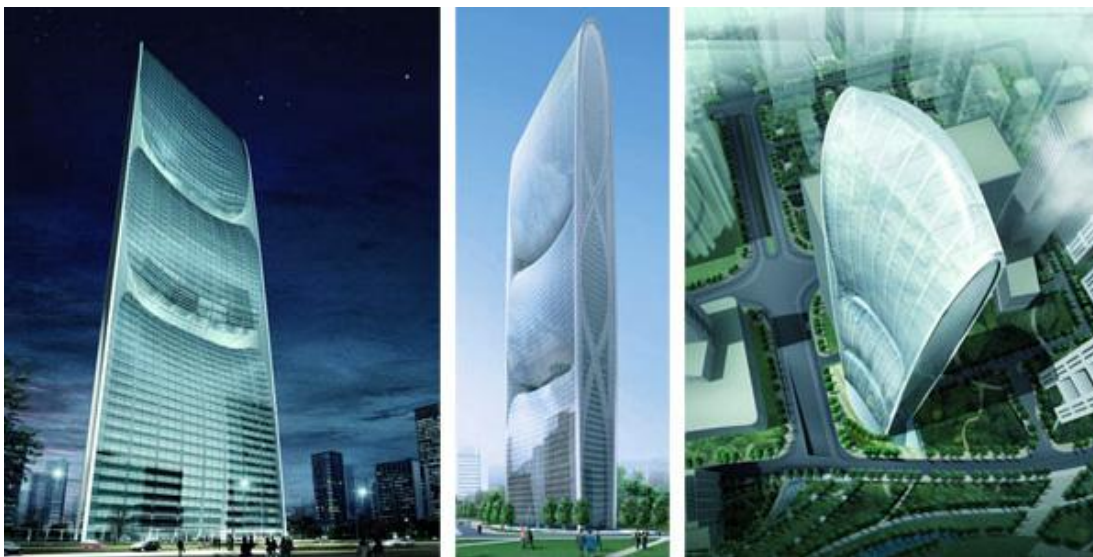
Figure 4.11 : Pearl River Tower, Guangzhou

Another mixed-use project is Fusionopolis in Singapore by Kisho Kurokawa. The project consists of the multi-dimensional layering of various functions such as commercial, residential, office functions and public areas in the tall buildings making up the complex. A city in the sky is created by vertical zoning which is a pretty unconventional method. Specialized cores for office and residential floors are present in each building of the complex, along with direct elevators to the public service floor and to the sky garden. The public life of the buildings is arranged on an artificial ground level with three dimensional layers, and multiple functions such as

gardens, entertainment and cultural facilities, shopping areas, restaurants occupy this space. Each building has a void in the center in order to make the fresh air circulate all through its floors and acts as a natural vertical air channel. Solar panels are positioned on the roof to provide solar energy, allowing at the same time the passage of some light to help the growth of trees of the sky gardens, which in turn, are designed to create public spaces on different levels of the buildings. The sky gardens are all linked through bridges which help them to be used more frequently. Besides all these, the waste produced in the buildings is processed and used as fertilizer for plants and fuel for generators, the rainwater is collected and recycled to be used in flushing the toilets and watering the plants, and the heat produced by human bodies is recovered to a certain degree to be utilized as a heat source (Url-4, 2008). Fusionopolis, which can be said to be a multi-layered city in the sky, seems to fulfill both the conditions necessary to be a sustainable and ecologically responsive building complex, and those rendering a high-rise a vertically positioned urban section through the vertical and horizontal relationships of its compartments, hence constituting an example of ecosystem-like new generation high-rise buildings with a certain utopian potential.

Figure 4.12 : Fusionopolis Project

The Conde Nast building (1999) in New York by Fox & Fowle Architects is an environmentally responsible high-rise building. The building has a very high performance in insulation and shading due to its curtain wall, and a ventilation system that can supply 50% more fresh air than the amount defined in building codes. These standards are being maintained in the operational phase of the building, as they had been during the construction phase. The penetration of daylight is maximized by the glazed areas of the curtain wall, whereas heat loss and gain are minimized. A certain amount of the building's electricity is generated by photovoltaic panels and the indoor air quality is maintained by the use of sophisticated mechanical systems. To ensure the building's sustainability throughout its life, the architects established some environmental standards for tenants, including power usage, lighting, fabrics and furnitures (Url-5, 2008). Being at the heart of the Times Square, a very busy and energy consuming landmark and crossroads of business, art, and leisure, Conde Nast building takes a bold step towards sustainability, giving a clue of the ecological high-rise of the twenty-first century. Anyway, despite these attempts towards greening, the building still possesses a single standing office block character, not really very capable of interacting with the urban life at all levels.
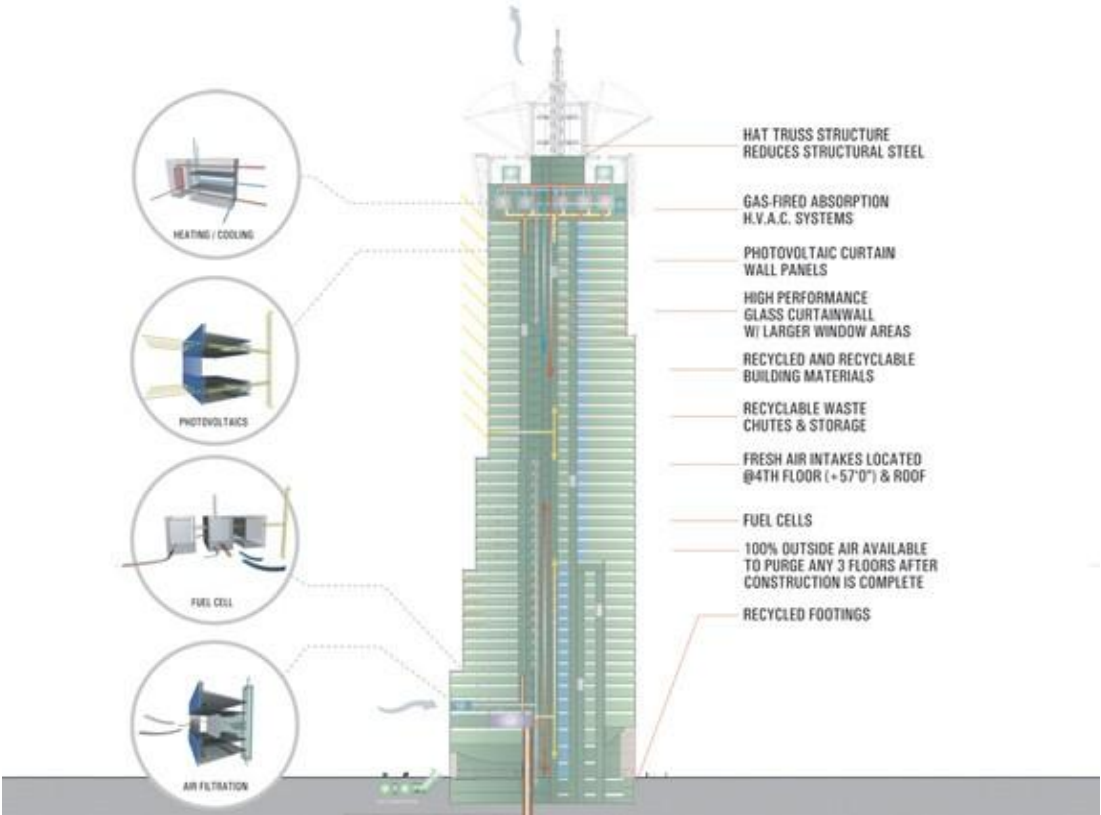
Figure 4.13 : Conde Nast Tower, New York

Figure 4.14 : Conde Nast Tower, New York

The Editt Tower project (1998) in Singapore by Ken Yeang is constructed on an urban site of which the natural ecosystem is destroyed to a great degree, with the aim of rehabilitating its ecological conditions. The landscaped areas of the building start to ramp up from the ground level, extending the street level activities such as the shops, performance spaces, cafes up the building and integrating the horizontal urban life in the vertical space. Besides the spatial continuity the tower ensures, a wide range of ecological precautions from the use of removable floors and partitions, and mechanical jointing instead of chemical bonding of materials, to special glazings, solar panels, sewage recycling, rainwater collections are thoroughly taken into consideration. Editt tower has over 55% water self-sufficiency because of

rainwater collection and water recycling and can achieve up to 40% of energy self sufficiency through its solar panel system. On the other hand, Yeang's Elephant and Castle Towers (2000) in London constitute a major example for the sky city concept. The complex formed of two towers has space for commercial, residential, hotel, office and park areas. A vertical landscaped environment runs upwards between the two blocks, giving existence to public and semi-private parks and courts. The heat gain is maximized during the winter by the southern orientation of the towers, and minimized in the summer by solar shading of the façades. Again, the façades help the natural ventilation through their large openings. Wind is buffered by the landscaped areas which also help to reduce the temperature in warm months of the year (Url-6, 2010).

Actually, in the near future high-rise would start to mean much more for the city than the tall office or residence tower, or simple and insufficient mixed-use developments, both in physical and social urbanistic terms. On the other hand, considering all of the determinants affecting high-rise design as a vertical urban extension as equally important, the investment values -which is currently a very crucial factor in the decision making process- could result quite high where the return-on-investment and net-to-gross ratios are not the only and primary concern, but eventually, as it occurs in most of the sustainably designed tall buildings, the overall result would turn very satisfactory in all terms, including economic and ecological issues. Additionally, the significance of the term sustainability would go far beyond the ecological concerns addressing only issues such as the energy conservation or recycling and reusing of materials and resources as it is commonly reduced to, dealing now with all of the other components of the urban ecosystem through a holistic approach.

5. CONCLUSION: THE REALIZATION OF UTOPIA THROUGH CONTEMPORARY HIGH-RISE ARCHITECTURE

The notion of high-rise has been considered by referring to its symbolic and functional values, to its utopian potential, and finally, as an urban ecosystem proposal throughout the thesis. As a conclusion, in this chapter, contemporary high-rise architecture is going to be discussed in terms of the previously issued notions and approaches, focusing on the design of a new generation of tall buildings as an adaptation and realization of utopian thought in the context of the twenty-first century.

As discussed in the second chapter, high-rise buildings -which are high-rise not because they are always hundreds of meters high, but because they result higher than the rest of their context- have existed since the earlier periods of the civilization, and have managed to be sustained by the various reasons to which they owe their existence. These reasons were primarily of highly symbolic nature at the earlier times: height was a metaphor for religious beliefs, for the highness of people who represented those beliefs, or even the God/Gods themselves; then it also started to stand for individuals and families of noble blood, and even for cities and nations. It was never easy or fast to construct tall buildings; they required almost super-human efforts, complicated know-how and techniques, and lots of time. This fact, actually, enhanced their symbolic character as architectural design objects, putting a considerable emphasis on the expressive nature of architecture. Even when diverse functions were inserted as part of the extending program of tall buildings, and a new type called 'the skyscraper' was introduced as a tall office building prototype, high-rise buildings did not cease to express some kind of exaltation through architectural means. Slightly different from their predecessors, it was now the corporate power and prestige they represented: the message of tall buildings was again abstracted and spread through the physical architectural features they were composed of. The functional value of tall buildings started to supersede the symbolic one by the insertion of multiple programs such as residences, hotels, business facilities, public amenities, etc. all at the same time into their configuration. This change was important in which the singular and monumental high-rise that stood alone on some plot in the city claimed to turn into a

system which involved various co-existing and co-working elements. The symbolic design object was therefore metamorphosed into something which expressed itself and the values it represented not only by means of its physical existence, but also by the ways it was utilized by people.

Being design objects which seemed to be impossible-to-build, high-rise buildings could always be said to be utopian in some way. Besides, because of the symbolic goals they served, they are not much different from the imaginary utopian city examples such as More's Utopia, Plato's Atlantis, or Campanella's City of the Sun, which symbolized wealth, well-being, and an ideal order of the society. The same fact is also valid for the utopian architectural designs which claim to be symbols of a much better order and way-of-being in comparison to the actual architectural environment they want to alter. After all, utopias in architecture differ from those in the literary genre only by the means they utilize to set up the perfect order, which in this case, is architecture itself. Utopia, when considered as eutopia, means in general the impossible, the ideal, or the ultimately best to reach; therefore, it stands as a symbol for the highest values of a society -which of course, are in continuous transformation in relation to the changing needs- and it functions as a holistic system which claims to consider every detail and element that contributes to the integrity of the system. Thus, it would not be innaccurate to consider high-rise as a powerful utopian tool, since it has always worked as a metaphor for the supremacy of all kinds, and the size and height of tall buildings exceeding those of the surrounding ones is one of the main reasons for which they are potentially more utopian than other architectural typologies.

However, what brings the notions of 'utopia' and 'high-rise' together is not merely the imaginative power that forces the technological limitations of a certain time period, or the act of symbolizing the supreme values of a certain society. It has to be considered that while utopia is a static concept, time, imagination and societies are dynamic in nature, and so has been the high-rise design throughout the history. Nevertheless, utopias mostly depict self-sufficient and self-enclosed systems, and since the introduction of mixed-use tall buildings, high-rise has been closer to the utopian thought because a 'city within city' concept was beginning to be expressed by high-rise architecture. Besides being 'high' in both physical and symbolic terms, tall buildings were now also aspiring to become self-sufficient and ideal systems, not too differently from the utopian idea of 'heaven' in certain religious beliefs, where all things are the best they could ever be, and all is taken care of effortlessly and successfully in a never failing system.

At the onset of the twenty-first century, it could be said that the high-rise developments all over the world have taken a new course. As widely issued in the forth chapter, a number of reasons such as the growing population, land and resource scarcity, and ecological necessities have rendered tall buildings indispensable solutions for the urban planning of world's largest metropolises. Anyway, since high-rise buildings might also cause severe problems in the city such as traffic, obstruction, poor ventilation and insolation, overcondensation of people in some hours, and completely blank urban spaces in the rest of the day, a new approach has begun to be adopted by architects and urban planners. By this approach, the already existing notion of 'multi-use high-rise' would be carried one step further in order to create 100% self-sufficient high-rise systems which would involve all of the systems and amenities existing in the city, acting as an ecosystem comprising multiple smaller ecosystems, and contained in a bigger medium which turns out to be the greater ecosystem that this new generation high-rise seeks to be a vertical metaphor of: the city itself.

The new generation high-rise results to be one of the most intelligible design solutions if high-rise is to maintain its existence. It seems to be quite practical if it might be able to realize all that it claims; on the other hand, it is also and conversely more utopian than ever in the history of tall buildings. The high-rise of the twenty-first century is by all means affected by the requirements of the era and of everyday life, but it also holds the potential to create and orient new life styles; it is utopian not only because it symbolizes the whole life cycle of the city as an ecosystem proposal, but also because it sets up a system which is self-sufficient, and then dictates the best possible way to become a part of it.

Utopia therefore, strikes again in the twenty-first century as a generative force for high-rise design. It functions as an archetype sheltering innumerable potentialities in itself, and accordingly it can be translated in many ways. This process is actually quite similar to the protein synthesis, where the archetypal DNA which is the main code is translated by the intervention of RNA, and with a singular archetype a great variety of proteins which are necessary for the proper functioning of the organism are produced. It is also essential that these proteins are created only when and where required, and in the exact necessitated amounts. Hence, considering utopia as an archetypal code, the new generation high-rise turns out to be a contemporary translation of it, and the architect works like the RNA, translating and interpreting this code in order to yield final products. As any protein maintains its existence in an

organism as long as it is capable of functioning in accord with the whole organism, and of reacting properly to its actions, the success of the new generation high-rise is also dependent on its full integration into the urban space. If ecosystems in nature are organic assemblages, then the assemblage of the new generation high-rise into the city which is actually a process of synthesis and adaptation, could be said to be a metaphor of these ecosystems. Therefore, the process of realization of the archetypal utopia in terms of high-rise design in the twenty-first century manifests itself as an assemblage which results to be the vertical ecosystem proposal itself.

The vertical ecosystem that tries to assemble itself into the urban realm is also enhanced by the physical metamorphosis high-rise buildings are being subjected to. Their utopian potential is now not only evolving around conceptual changes, but is also being impacted by several developments in technological context. The process is actually not much different from the emergence of new tall building typologies due to the achievement of higher technological goals several times in the history, for instance, such as the birth of the 'skyscraper' due to the invention of the elevator, to the use of new materials and mechanical systems in the building industry, and to the utilization of new construction methods developed at the late nineteenth century. Then, it is likely that in the twenty-first century, the design of tall buildings is being affected by technological determinants such as the high quality steel and concrete, fire and corrosion resistant steel, composite materials and systems (Hasol, 2007).

The utopian potential of super-tall buildings, or megastructures of the twenty-first century is thus additionally based on the phyical transformation which is both a reason and a consequence of the conceptual shift, and it reveals itself through advancements in techologies, and not only those in the building and construction industry. Many materials, techniques, and methods are being borrowed from other industries in order to contribute to the construction of the new generation high-rise, emphasizing thus the interdisciplinary and holistic nature of the vertical ecosystem approach. For instance, aerodynamic design principles can be both applied to the design of airplanes which have to deal with air resistance, and to high-rise buildings which also have to resist wind load, similarly, Frank Gehry utilizes a software system (Catia) which is originally developed by a French aerospace company; technology may therefore be transferred from one industrial branch to another by the means of adaptation and assimilation (Ali & Armstrong, 2008). Consequently, it is quite possible that tall building design which is now able to get over the negative effects of more natural forces, would be free to take new directions through the applications of new technologies transferred from other disciplines. The birth of a new generation of

high-rise then also depends on visionary advances and extensive use of technologies, as well as it depends on visionary changes in the philosophy of high-rise.

Tall buildings of the twenty-first century also make use of intelligent systems, getting closer in their whole functioning to that of the natural ecosystems. The intelligent buildings are capable of being interactive and responsive to the people, management, places, and processes, and they are also able to generate an optimum dynamic response to the environmental stimuli, a feature which would enable buildings to achieve maximum energy-efficiency (Ali & Armstrong, 2008). As materials, technology and structural systems get smarter, many innovations are allowed to be accomplished by the building industry in order to create more liveable environments in the sky, which aims to reach this goal by further mimicking the natural ecosystems, and by being responsive to all man-made and natural ecosystems. For example, the use of composite materials and nanotechnologies are not only new to architectural design, but they are also being very freshly introduced and made use of in other industries. A relevant example would be the mixed-use 'Carbon Tower' by Peter Testa, which is mainly composed of carbon fiber composite materials which despite being not commonly used in tall buildings, hold the promise of enhancing the strength of structural elements such as beams, columns and girders, providing considerable decrease in the mass and weight of high-rise buildings, and having almost infinite life span; on the other hand, smart materials which can be altered by external stimuli such as moisture, temperature, stress, magnetic and electric fields, and etc., and nanotechnology which involves the manipulation of materials, and production of devices smaller than one micrometer can be applied to tall building design in order to ensure energy- efficiency, structural integrity, fire safety and water conservation (Ali & Armstrong, 2008).

Utopia, as discussed in the third chapter, may take the forms of 'eutopia' and 'dystopia'. Likewise, the high-rise design in the twenty-first century may choose one particular pathway according to the interpretation of the utopian thought. Currently, many super-tall, energy efficient and self-sufficient high-rise buildings are being designed and constructed worldwide. Especially many cities in regions such as the Middle East and Eastern Asia are in the race of building the tallest and smartest high-rise systems by which they would gain whole new and strong brand values, and attract more people and capital which would ensure the continuity and nourishment of these systems in some kind of vicious circle. Although the consciousness level regarding the ecological issues is quite elevated, and generally

a greater attention is paid to energy efficiency, a considerable number of high-rise designs fail in interpreting correctly the whole of the contextual data. Their construction and maintenance processes involve very complex and advanced technologies, and the entire utopian realm they create functions quite perfectly per se; however, as cities within the city, or ecosystems within the ecosystem, they contribute very little, or not at all to the integrity of the whole. That is, actually, the point where they fail to become ecosystems, since no ecosystem can exist without relating itself to other ecosystems. For instance, when a hundreds of meters high building entirely glazed on all façades soars with its golf courses, hotels, residences, shopping malls, leisure areas, and any other function which would take place in a regular city, in a climate and context such as Dubai, it generally addresses no real connection with its surroundings, but on the contrary it aspires to become a huge gated community. The more alienated it is, the more dystopian features are produced from the utopian high-rise archetype. Similarly, in a city founded and developed primarily because of being a natural port for marine commerce such as Hong Kong, none of the hundreds of tall buildings tries to establish a meaningful connection to the sea, other than considering it part of a nice vista from the upper floors. Even though many of the newly designed and constructed high-rise buildings of the twenty-first century manage to constitute self-sufficient systems, those are also mainly self-enclosed, and ignoring the outside world. In this regard, they define universes as dystopian as Huxley's Brave New World, Orwell's Nineteen Eighty-four, or even More's Utopia, where even a little contact with what is not a product of these scenarios is unwanted, unbearable, and even harmful to the functioning of the system.

Thus, the generative force of utopian thought on most of the new generation high-rise buildings works to produce dystopias, purposefully disconnected with the context, and fixed in the cities as parts of a montage. They try to legitimize and glorify their own existence, and deny the rest of the city. On the other hand, the vertical ecosystem proposal could also turn into a 'eutopia'. If high-rise is to be considered as an ecosystem on its own, then it should be handled in a holistic manner, comprising all of the physical, social, technical, political, economical, public and private bonds and interrelationships with any other smaller or bigger ecosystem, and at the same time within itself. Most importantly, if the utopian code orienting the development of high-rise buildings in the twenty-first century is to be translated in order to realize a 'eutopia' instead of 'dystopia', then the vertical ecosystem proposal should find ways to function not as merely a montage, but an assemblage to the

city, turning gradually and naturally into an extension of it, and offering a possibility to the utopia of fulfilling its prophecy, a successfully working whole. For any of the humankind's inventions, being ideal is out of reach, but anyway, it is still not beyond practical possibility for the high-rise of the twenty-first century to realize what is beneficial for cities and people.

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