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- Authors:** Aysin Sev, Associate Professor, Mimar Sinan Fine Arts University
Aydan Ozgen, Mimar Sinan Fine Arts University
Bahar Basarir, Mimar Sinan Fine Arts University
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Design Criteria for High-Rise Buildings in Historical Cities: The Case of Istanbul

Aysin Sev¹, Aydan Ozgen¹, Bahar Basarir¹

Mimar Sinan Fine Arts University, Faculty of Architecture, Building Technology Department, Istanbul, Turkey, E-mail: aysinsev@yahoo.com; baharbasarir@gmail.com



Aysin Sev

Biography

Dr. Aysin Sev is a full-time Associate Professor in the Building Technology Department of Faculty of Architecture, Mimar Sinan Fine Arts University. She received her MSc (1997) and PhD (2001) degrees in high-rise building technologies. Areas of research topics are high-rise buildings, sustainable architecture and construction, green building assessment, energy efficient buildings, detailing and ecological design. She has numerous articles and conference papers published internationally and nationally. She is also the author of the book 'Sustainable Architecture' and co-author of the book 'Structural Systems for Multi-Storey High-Rise Buildings', which are both published in Turkish. She is currently employed as an Associate Professor in the Building Technology Department of Mimar Sinan Fine Arts University, and gives the lectures on building technologies, high-rise buildings, sustainable architecture and energy-efficient buildings.

Abstract

High-rise building construction, which is occurring at an expanding pace in many cities all over the world, is also accelerating in Istanbul. A large number of multistorey office, residential and multi-use buildings are being planned and constructed in the city center, as well as in the periphery. In addition to the historical character of the city, the geography has a special character with seven hills and several high peaks, and this character enhances the skyline of the city. Having a traditional skyline, Istanbul has largely been impacted by the erection of high-rise buildings in the past decades, whether they are built in the historical core or not. Today, it is unfortunate to state that the recently erected high-rise buildings, especially in the Bosphorus Region, are not in harmony with the silhouette of Istanbul. Although not erected within the Bosphorus region and historical core of the city, some of the high-rise buildings unfortunately impact the historical silhouette because of the special topographic character of the city.

This paper discusses the potential impacts of high-rise buildings on the built heritage and historical skyline of the city, and presents how the historical silhouette of Istanbul has changed in time. Also the parameters for decision making when locating a high-rise building within the urban area and historical built environment are revealed for architects and urban planners in order to help to develop a planning guide for high-rise buildings.

Keywords: High-rise buildings, historical heritage, city silhouette, Bosphorus.

Introduction

The high-rise building type is a technological innovation of the 19th century as a response to the economic, social and industrial changes in urban areas. North American cities such as Chicago and New York are the birthplaces of commercial high-rise buildings due to the scarcity of land in urban centres, high land cost, economic prosperity and material innovations at the end of 19th and early 20th centuries. According to Madanipour (2006), cities are changing in competitive efforts to attract resources and investment in order to underpin their economies and ensure the well-being of their communities. Changes in the economy of big cities are reflected in the increase in land values and the demand for maximising profits through this building type. Associated economic revitalisation accompanied by pressure to re-image, reposition and re-brand the identities of cities, and pressure from landowners and property developers to maximise returns, have resulted in ever taller landmark buildings being proposed (Short, 2007). As a result of globalization, growing population, and rapid economic development in Asian countries during 1980s and 1990s, this building type became widely constructed in cities, such as Hong Kong, Shanghai, Tokyo, Kuala Lumpur, Guangzhou and Taipei. Currently, Middle Eastern cities, such as Dubai, Abu Dhabi and Bahrain, are making investments in urban developments and tall buildings, not only as a consequence for urban densification, but for prestige as well.

High-rise building construction, which is occurring at an expanding pace in many cities all over the world, is also accelerating in Istanbul. A large number of multistorey offices, residential and multi-use buildings are being planned and constructed in the city center, as well as in the periphery. In addition to the historical character of the city, the geography has a special character with seven hills and several high peaks, and this character enhances the skyline of the city. The Bosphorus, which connects the Sea of Marmara to the Black Sea, divides the city into the European and Anatolian sides, and makes it the only bi-continental city in the World. Having a traditional skyline, Istanbul has largely been impacted by the erection of high-rise buildings in the past decades, whether they are built in the historical core or not. Until the 1970s, the domes and slender minarets of the mosques oriented the skyline of Istanbul. In 1970s, as a result of inevitable development of the service sector parallel to the changing economic model, construction activities was integrated with mass production in the city. New urban centres were equipped by progressive projects supported by multinational business world. New programs and needs entered the architectural era. For example, the office building programs of the mid 1970s promoted the big investments and state enterprises. These large programs changed the scale of the city and necessitated new typological, structural and technical solutions of prestige and high-rise buildings. Even mega structures were introduced in the silhouettes of historical urban areas, which fortunately have saved their originality up to the present time, despite the fact that they have never had examples of monumental architecture, except for religious examples traditionally. Today, it is unfortunate to state that the recently erected high-rise buildings, especially in the Bosphorus Region, are not in harmony with the silhouette of Istanbul. Although not erected within the Bosphorus region and historical core of the city, some of the high-rise buildings unfortunately impact the historical silhouette because of the special topographic character of the city. Today, the unexpected high-rise buildings became the decoration of the city, which was dressed by the monuments with domes and minarets in the past.

This paper discusses the potential impacts of high-rise buildings on the built heritage and historical skyline of the city, and presents how the historical silhouette of Istanbul has changed in time. Also the parameters for decision making when locating a high-rise building within the urban area and historical built environment are revealed for architects and urban planners in order to help to develop a planning guide for high-rise buildings.

High-Rise Buildings and the Historical Built Heritage

High-rise buildings have a significant impact on cities and their metropolitan areas in a variety of ways, most notably on the historical built heritage. All new buildings in a historical environment have an impact on the city's historical silhouette and context. The introduction of a large-scale and new building into a city results in an intervention within the existing urban context. The insertion of tall and large-scale buildings into the urban environment alters the pre-existing urban conditions. A new high-rise building greatly impacts the scale and context of the urban environment due to its scale and proportional mass and height. Therefore, it demands a different set of considerations when decision-making within the urban environment (Sev, 2000). Whether standing alone or in clusters, the intervention of this building type affects daylighting, sunlight shadows and air movements, changing the microclimate of the locality.

The current trend for high-rise buildings, and attempts to limit or encourage them, reflects the increasing impact of globalisation on the development of the world's major cities (Abel, 2003; Höweler, 2003). Major cities compete on the global stage to have the tallest building with which to announce the confidence and ascendancy of value in their economies and cultures. High-rise buildings function as powerful advertising instruments to their occupiers. McNeill (2002) suggests that political leaders have left their mark on the urban landscape of the cities they represent with tall buildings in many instances; for example, the Malaysian President's public backing of the Petronas Towers in Kuala Lumpur as a symbol of his country's entry into the global economy; the London Mayor's support for a number of tall building proposals such as the London Bridge Tower; and the support by a series of French Presidents of La Défense in Paris. All of these examples attest to the kudos and power of the political elite through the architecture of the cities they represent.

Phelps, Ashworth, and Johansson (2002) suggest that the built heritage is a cultural and social construction, which is dependent upon a complex process of selection, protection and intervention. The built heritage is normally protected through selective regulatory mechanisms that seek its conservation from inappropriate development or demolition, effectively prioritising public over private interests in seeking to protect elements of the townscape for the common good (Phelps et al., 2002). Ashworth (2002) also indicates that the survival of built heritage relates to intentional choices to create, maintain and preserve selected senses of place hinting that different interpretations and understandings of the meaning of place can co-exist. Graham, Ashworth, and Tunbridge (2000) acknowledge that built heritage is a cultural product and a political resource, which reflects that particular heritages and heritage interpretations are promoted through regulatory systems and popular debates.

The value attached to the built heritage by interest groups is diverse, covering cultural, economic, political and aesthetic values, which often overlap and compete (Mason, 1998). The built heritage value reflects dominant narratives about the development of the city (Mourato & Mazzanti, 2002). As such, it is to be expected that the dominance of any of these values that shapes the way in which tall building proposals, and their impact on the built heritage, is analysed and determined. As a result, when tall building applications are assessed by planning authorities, they are confronted not only with decisions over what the built heritage is and what value is attached to it (Mason, 1998).

The Impact of High-Rise Buildings on the Built Heritage

High-rise buildings have an impact on the surrounding urban grain and the skyline of the city in a number of ways. This impact can be examined by two levels; firstly on the city and its systems, and secondly on the city skyline. A tall building has to come to terms first with the city that is already there. The point at which the building hits the ground contributes to a sense of the public realm. It needs to resolve the issue of massing and how the scale of the new tower as a whole related to the image of the city, to the city block, and to the neighbouring structures. Most importantly it must resolve how it relates to the street's edge, the pedestrian scale, the existing land use, and the character of the block where it is located (Beedle, et.al. 2007). The surrounding urban grain may have a clear pattern or character, which can immediately be affected by a high-rise building through its distinctive height, being generally taller than the immediate area, and scale, its relative size and shape (Cohen, 1999). In terms of built heritage, buildings and areas represent the uniqueness of place in their protection through regulatory systems. Secondly, high-rise buildings impact upon the uniqueness of the skyline of a city. The skyline can be appreciated from many viewpoints. When viewed from a far, the city appears in profile as a distant silhouette. The city profile is often most clearly seen from the arrival points, which are from the great city gateways or portals. Alternatively it may appear dramatically in view from high points in the surrounding landscape while from elevated positions within the city, panoramic views of roofscape are not unusual. Landmarks, which may be remote from the viewer, the dome of a mosque or cathedral, or the delicate minarets of the local masjid, stand out from, and impose themselves on the surrounding skyline. Such landmarks perform the main decorative role in the city skyline. They are the jewels in the crown, often emblematic of the city. The decoration of the city, and particular its skyline, can act as a collective symbol, something that represents the city (Moughin, et.al. 1995). The skyline defines the image of the city as graphic symbols and civic emblems (Attoe, 1981; Kostoff, 2001). Attoe (1981) indicates that skylines also reflect that it can be intentionally created to project an image of the city and of the city as an urban collective with a particular brand. The skyline is particularly sensitive to change. A new high-rise building definitely impacts upon the skyline positively and negatively; it enhances a cluster of high-rise buildings on the skyline or detracts from that cluster if inappropriately sited (Short, 2007).

High-rise building developments should ensure that they will not jeopardize local environmental quality, existing patterns of street life and subcultures, the existing townscape, and the landscape. If the traditional topology of the city consists of largely of a mat of the low-rise buildings as the city's characteristic feature, then the new building's massing should blend with the scale of existing buildings and take it into consideration for conservation, preservation, and adaptive reuse (Beedle, et.al. 2007).

Design Criteria for High-Rise Buildings in the Built Heritage

High-rise buildings have the potential to impact on the elements of the townscape that have been protected through regulatory systems, the built heritage. This traditionally includes elements such as protected buildings, archaeological areas, ruins and monuments (Cohen, 1999). Furthermore, it also includes elements such as protected parks, battlefields and the grounds of stately homes which are not necessarily part of the built heritage but which contribute to its character, scale and image. The following criteria must be carefully considered during locating a high-rise building in an existing urban environment in order to conserve the historical built heritage:

i. The relationship to context, including natural topography, scale, height, urban grain, streetscape and built form, and the effect on the skyline. High-rise buildings should have a positive relationship with relevant topographical features and other high-rise buildings.

ii. The high-rise building must conserve, or not damage or detract from:

- World heritage and local historical sites and their settings,
- Registered ancient monuments, their settings, and registered buildings,
- Conservation areas and their settings,
- Other open spaces, including rivers, waterways, the Straits, their settings and views from them,
- Other important views, prospects and panoramas.

iii. The architectural quality of the building including its scale, form, massing, proportion and silhouette, facing materials and relationship to other structures. The design of the top of a high-rise building is also important when considering the effect on the skyline (Sev, 2009).

In identifying locations, where high-rise buildings should and should not be appropriate, local authorities must carry out a detailed urban design study. This study should take into account historic context through a character appraisal. It should identify those elements that create local character and other important features and constraints, including streetscape, scale, height, urban grain, natural topography, significant views of skylines, landmark buildings and areas and their settings, including backdrops, and important local views, prospects and panoramas. Opportunities where tall buildings might enhance the overall townscape, or where the removal of past mistakes might achieve a similar outcome, should be highlighted. Having identified the constraints and opportunities through an urban design study, specific policies should be included in local development plans clearly identifying areas, which are appropriate, sensitive or inappropriate for high-rise buildings. In some historical cities and areas, historic environment considerations may be of such significance that no high-rise buildings will be appropriate (CABE and English Heritage, 2007).

The Case of Istanbul

Istanbul, which is located in north-western Turkey within the Marmara Region, is a highly developed city with a Mediterranean climate and an extremely high population. In 1950 it had a population of 1.116.477 residents. The number of citizens almost tripled during the 30 years between 1980 and 2010, and the city currently has a population of 12.782.960 residents on an area of 5.343 sq. kilometres according to the statistics of Türkiye İstatistik Kurumu (TUIK, 2011). The rate of population growth in the city is currently 3.45% a year on average, due to the migrations from the rural areas of the country. The population density is 2.392 people/sq.km, which far exceeds Turkey's population density of 96 people/sq. kilometres.

Istanbul is one of the finest traditional cities, where the topography and the city serve to combine to enhance the skyline (Figure 1). The geography of the city is hilly with several high peaks. The Bosphorus, which connects the Sea of Marmara to the Black Sea, divides the city into the European and Anatolian sides, and makes it the only bi-continental city in the World. The city is further divided by the Golden Horn, a natural harbour bounding the Peninsula, where the former Byzantium and Constantinople were founded. The confluence of the Sea of Marmara, the Bosphorus and the Golden Horn has attracted attention for thousands of years and still remains a prominent feature of the city's historical landscape.



Figure 1. The historical silhouette of Bosphorus oriented with minarets and domes.

The historical trace of the dominant informal structure in Istanbul goes back to modernization attitudes and rapid urbanization of the 20th century. After centuries of being the capital city of the Roman, Byzantium and the Ottoman Empires, with the establishment of the Turkish Republic and moving the administrative functions to Ankara in 1923, the city had lost its importance. After the long years, the city's population had decreased to 650.000 in 1923, nearly half of the population in 1914. Consequently the government was forced to rethink the urban planning of Istanbul. The French architect and town planner Leon Henri Prost (1874-1959), who was responsible for the Paris Regional Plan of 1928-1939, was brought in to design the Istanbul Master Plan (1936-1958). Prost's planning approach was to build large roads and boulevards, and destroy the old city fabric, which he considered unsuitable for the modern nation. The construction of the new residential blocks in the shrinking city was the start of the reshaping of the city, which created differentiation in terms of building hierarchy and organization (Tekeli, 2010).

Istanbul's population rapidly increased from 1.116.477 in 1950 to 1.822.092 in 1960, and the borders of the city enlarged. Table 1 shows the rapid population growth in Istanbul, and also indicates how the population of Turkey is moving rapidly to Istanbul. New forms of urban development such as flat ownership and housing co-operatives led the city's expansion to new areas also. From 1950 onwards, administrative efforts in the field of urban development and the increase in national and international, socio-cultural activities restored Istanbul to its prime position in the social and political life of the country. As Istanbul's importance and population grew and its economy expanded, many institutions underwent changes in scale, context and appearance by 1950s. Renovations were carried out on many buildings from the Town Hall to the Low Courts, from schools to hotels and business centers. Buildings that reflected technological progress and the fashionable architectural trends of the day endowed Istanbul with a new urban landscape and new image (Batur, 1996).

Table 1. Growth of population in Istanbul and Turkey.

Years	Population of Istanbul	Population of Turkey	Population of Istanbul/Population of Turkey (%)
1950	1.116.477	20.947.188	5.33
1955	1.533.822	24.064.763	6.37
1960	1.822.092	27.754.820	6.57
1965	2.293.823	31.391.421	7.31
1970	3.019.032	35.605.176	8.48
1975	3.904.588	40.347.719	9.68
1980	4.741.890	44.736.957	10.60
1985	5.842.985	50.664.458	11.53
1990	7.309.190	56.473.035	12.94
2000	10.018.735	67.803.927	14.78
2010	12.782.960	73.722.988	17.98

Historically, the first business commercial zone area to appear in Istanbul was Eminönü. Afterwards the commercial district of the city moved towards an axle on Besiktas, Zincirlikuyu and Maslak. Istanbul have had only a few high-rise buildings of less than 20-stories by the early 1970s. The 12-stories 17th Headquarters of Karayollari, 17 stories Marmara Etap Hotel, and 21-stories Odakule Business Center are a few of these initial high-rises of Istanbul.

The late 1970s and the 1980s faced the rapid changes and an exalating number of high-rise buildings with more than 20 stories. The 23-stories Ceylan-Intercontinental Hotel in Taksim, the 28-stories Harbiye Military House in Harbiye, and the 30 stories Haci Omer Dormitory Building were a few of the tall buildings being erected in the new commercial district of the city. All these buildings, which were built in the period between 1975 and 1985 began to change the skyline of the traditional city.

By the 1990s, paralel to the increase in land values of the business district, which is expanding on the Besiktas-Zincirlikuyu-Maslak axle, the number of high-rise buildings increased and the heights reached to a range of 40 stories. Today, the tallest building of the city is the 54-stories and 261 meters high Sapphire Residential Tower, which is completed in 2010. The Isbank Towers, Metrocity Residential and Office Towers, Sabanci Center Towers, Maya Akar Business Center, Tat Twin Towers, Suzer Plaza, Sisli Plaza, Elit Residence and Tekfen Tower are the most remarkable high-rises of the city's skyline, which are constructed in the past two decades. There also exist a few more towers under construction in the same business district of the city (Figure 2).



Figure 2. The most remarkable high-rise buildings of Istanbul, which are constructed in the past two decades.

The tall buildings mentioned above are not all located in the historical district of the city. However, they all have an impact on the historical heritage and skyline of Istanbul, especially the silhouette of Bosphorus, due to the topography of the city (Figure 3).



Figure 3. The silhouette of Bosphorus, which is oriented with the recent high-rise buildings.

Istanbul being one of the finest traditional cities, has a special character of topography, which enhances the skyline. Changing patterns of influence and their impact upon the skyline as a decorative element of the city is clearly illustrated in this city. Until the 1970s the skyline of Istanbul was oriented by the domes and slender minarets of the mosques. But today, it is unfortunate to state that the recently erected tall buildings, especially in the Bosphorus Region, are not in harmony with the silhouette of Istanbul. The unexpected high-rise buildings became the decoration of the city, which was decorated by the monuments with domes and minarets in the past.

Today, there are 2.146 high-rise buildings in Istanbul, which is the ninth city of the world in the rating of cities with high-rise buildings (CTBUH, 2011). The city is now facing the problem of increasing urban density. Considering the social and economic conditions of the city, it is important to recognize that solutions to the urban densification are not simply a matter of applying technologies and enforcement through legislation.

Discussion and Conclusions

Population growth and escalating rates of urbanization are the main forces, which shape our urban environments today. Today, urban planners' and architects' tendency is to design sustainable cities, which also incorporates high-rise building developments. The benefits of promoting high-rise building developments include cost savings in land, infrastructure and energy, reduced economic costs of travel time, lower emissions to the air, concentration of knowledge and innovative activity in the core of the cities, lower crime and greater safety.

However, there are significant barriers to the effective management of high-rise buildings, especially in urban environments with historical built heritage. The roles of the architects and urban planner must be redefined continuously in terms of both changes in their respective professions as well as changes in society. There is a need to increase collaboration among the professions, in addition to increasing their awareness of larger changes, which effect social demographics, economic conditions, and physical contexts for which they are designing and building. Additional research is needed to define the collaborative roles of these professionals. Architects and planners are realizing that historic patterns and fabrics of existing cities must be understood and preserved when introducing high-rise buildings as interventions into these contexts.

The manner in which architects and planners can preserve existing buildings, neighborhoods, and patterns of use, while introducing new buildings is an important and difficult issue. Without proper planning and zoning, the tendency is to build increasingly taller and larger buildings, compromising all the buildings adjacent to them. These trends have had an adverse impact on the physical and social environment of the city. The historic patterns and textures of the old and picturesque cities must be preserved, yet new architecture, which accommodates changing needs and growth must be introduced. These issues are complex and cannot be resolved simply by using historical planning strategies developed without high-rise buildings in mind.

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