CUI '22

X. INTERNATIONAL CONTEMPORARY URBAN ISSUES CONFERENCE PROCEEDINGS

DAKAM

CUI '22

CUI '22 / X. INTERNATIONAL CONTEMPORARY URBAN ISSUES CONFERENCE PROCEEDINGS
ISBN: 978-625-7034-25-8

Özgür Öztürk DAKAM YAYINLARI
December 2022, Istanbul, Turkey.
www.dakam.org
Firuzağa Mah. Boğazkesen Cad., No:76/8, 34425, Beyoğlu, İstanbul

Cover Design: D/GD (DAKAM Graphic Design)
Cover Photo:

Print: Metin Copy Plus, Mollafenari Mah., Türkocağı Cad. 3/1, Mahmutpaşa/Istanbul, Turkey

Conference Coordination: DAKAM (Eastern Mediterranean Academic Research Center)

CUI '22

X. INTERNATIONAL CONTEMPORARY URBAN ISSUES CONFERENCE PROCEEDINGS

DAKAM

CONTENTS

A SPATIAL MEMORY READING ON URBAN SPACES: TAKSİM SQUARE

YILDIZ AKSOY[1]

ABSTRACT

Urban spaces are a place where many events take place and each event leaves its mark on the physicality and image of the city. This relationship that the people of the city establish with the space imposes some meanings and values on the objects or spaces in the urban space. Therefore, urban space becomes a phenomenon that can be produced in a very different way in the memory of communities. Cities emerge as living organisms that consist of the sum of the images of the communities they host and also have their own memories, and the concept of urban memory begins to come to the fore. Taksim Square, which has an important value in the urban identity of Istanbul and in the memory of its residents, is among the most important public spaces of Istanbul with its importance in many respects. Taksim Square has witnessed important social and political events and gathered thousands of people. Today, however, the impression of Taksim Square in social memory has begun to shift to a different place. For this reason, the aim of this study is to examine the change and transformation that Taksim Square and its immediate surroundings have undergone from the past to the present.

Keywords: Urban Space, Social Memory, Taksim Square

[1] Assoc. Prof. Istanbul Medeniyet University, Faculty of Art, Design and Architecture, Urban and Regional Planning Department, İstanbul. E-posta: yildiz.aksoy@medeniyet.edu.tr ORCID: 0000-0002-8804-8337

1. INTRODUCTION

Cities are places where various aspects of past events are reflected and expressed through personal memories and narratives. Major cities in particular concentrate on major clusters of national signs that represent the cultural values of local communities. The city is a composite of mind/emotional states, mentalities, collective memory, and traditions, all of which intertwine the past, present, and future development of the city. Cities have functioned as living symbols of the civilizations they belong to throughout history. Such cities hold strong symbolic meanings for the urban space, as exemplified in the great Baroque designs of 17th and 18th-century Italy and France. Wim Blockmans defines cities as "theatres" where political regimes display their ideologies and social practices (Blockmans, 2003).

Capitals have been used as platforms for state rituals, festivals, celebrations, and other public events, where spaces and buildings can have symbolic meaning, with reference to political power, nobility, and the wider public. For this reason, people attribute symbolic importance and meaning to places due to their associations with certain events in human history. Examples of well-known historical places where people gather for celebration and protest are Alexanderplatz in Berlin, Times Square in New York, Tahrir Square in Cairo, and Taksim Square in Istanbul. These squares are urban spaces with a strong historical association and meaning in terms of political power, celebration, and public demonstrations (Gül et al., 2014).

Urban spaces have an important place in terms of social memory. Because urban spaces are places where people of all ages, education, and socio-cultural backgrounds establish human relations and have a common memory. For these reasons, public spaces are places that play an important role in the formation of memory and its sustainability. Memory is always associated with space. The reciprocal relationship between historical, economic, and social developments and urban space is also present between urban memory and urban space. Therefore, the analysis of the dialectical relationship between urban memory and urban space and the investigation of environmental perception and their representation in memory provides an important potential to understand the abstract reflections of memory on urban space, beyond just perceiving it as a physical entity. Urban memory can be considered as an expression of the collective memory that takes shape in a certain space as time passes.

Although memory and history are often considered synonymous, research today sees them as fundamentally opposite. According to Nora (1989), memory is life; remains in constant evolution, open to the dialectic of remembering and forgetting (Nora, 2006). History is the reconstruction of what is no more. At its core, memory is a constant current phenomenon, a link that binds us to the eternal present, whereas history is a representation of the past. Memory can be defined as experience while history can be defined as the preservation of lived experience (Crane,1997).

French sociologist Maurice Halbwachs was the first to use the term "collective memory" in his books The Social Frame Works of Memory (1992 and 1925) and On Collective Memory (1980 and 1950). The concept of collective memory is based on the contrast between collective and individual memory, as he calls collective memory "personal" and "autobiographical", while collective memory is "social" and "historical" memory (Hussein et al., 2020).

According to Halbwachs (1992), history is the past that is remembered with which we no longer have an “organic” relationship, and collective memory is the active past that forms our identities; therefore both history and collective memory are public social facts, the first being "dead" and the second "living".

In this study, studies on social memory were compiled and interpreted. The relationship between social memory and space is discussed in the example of Taksim Square. Examining the development of Taksim Square in the historical process is important in the context of social memory. Because Taksim Square and its immediate surroundings; It is an important symbol of Istanbul's urban memory and identity. Taksim Square, which has an important value in the urban identity of Istanbul and in the memory of its residents, is among the most important public spaces of Istanbul with its importance in many respects. Taksim Square has witnessed important social and political events and gathered thousands of people. However, the gathering feature of Taksim Square has started to disappear gradually with its current situation. His impression of social memory has begun to shift to a different place. For this reason, located in the center of Istanbul; In addition to its dynamism, the aim of this study is to examine the change and transformation of Taksim Square and its surroundings, which constitute the focal point of urban activities with its many problems, from past to present.

2. HISTORICAL DEVELOPMENT PROCESS OF TAKSIM SQUARE

In order to understand the importance of Taksim Square in the context of social memory in the historical process, it is necessary to examine the Historical Development Process of Taksim Square. During the Ottoman period, there were four important centers of Istanbul: the Old City of Istanbul, Galata across the Golden Horn, Eyüp on the northern shores of the Golden Horn, and Üsküdar on the Asian shores of the Bosphorus. Galata hosted Genoese merchants during the Byzantine period. Located on the top hill of Galata, the district was named Pera by the Greeks, meaning 'across the Golden Horn', and Beyoğlu by the Turks. Beyoğlu had become a center for Westerners living in Istanbul during the Ottoman period. It was home to diplomatic envoys and missions, and western-style cafes, hotels, restaurants, and entertainment venues were opened. All this enriched Beyoğlu, making it the most Europeanized area of Istanbul in the 19th century (Gül, 2012).

It was located on the northern slopes of the Taksim Golden Horn, where Taksim Square is located, which is the subject of this research, and across the city of Istanbul, which is surrounded by ancient walls. The history of Taksim began in 1732 with the construction of a water distribution building during the reign of Sultan Mahmut I. Pera was supplied with water through canals built in the 18th century, and Taksim, the most important point of Beyoğlu, became the water distribution center of the three big dams feeding the city. The dams were built during the reign of Mahmut I to supply water to Galata and the northern shores of the Bosphorus.

Taksim Square Maksem, a water distribution center built in 1839 during the Ottoman period, is surrounded by culturally and historically important structures such as the Mahmud I Fountain next to Maksem, Taksim Gezi Park, Atatürk Cultural Center, and The Marmara Hotel, built in 1972. The history of Taksim Square as a public space is quite unique. It is at the northern end of Grand Rue de Pera, next to Pera, one of the oldest residential areas of the city. This district, together with Galata, the site of the former Genoese colony and a business and commercial center, served as a city center for minorities of different ethnic origins in the 19th century, ranking second only to the city's main powerhouse in the Old Peninsula. Settlement in this area began in the 17th century when wealthy Europeans built their houses and gardens here. Until the 17th century, there was not much in Taksim apart from a few vineyard houses. Since this area is outside the walls of Galata, the people living in Galata used the places we know as Tepebaşı, Istiklal Street, and Taksim area as cemeteries.

However, it was during the reign of the Ottomans that Tepebaşı, Istiklal Street, and the Taksim area turned into the biggest cemetery in Istanbul. During the reign of Suleiman the Magnificent, there was a great cholera epidemic in Istanbul. Due to the cholera epidemic, burials inside the walls were prohibited. The bodies of those who died in Istanbul were taken outside the city walls and buried in Taksim and its surroundings so that cholera would not infect others. A large area, starting from Sıraselviler, which includes the area where today's Gezi Park is located, to Harbiye and Kasımpaşa on the one hand, and to Dolmabahçe on the other hand, was used as cemeteries for Muslims and non-Muslims (Figure 1) (Gülersoy, 1986).

Figure 1. *View of the Cemeteries in Taksim on the Pervitich Map*
https://www.timeturk.com/tr/2013/06/09/taksim-deki-musluman-mezarligini-kim-yok-etti.html

Tepebaşı, which was turned into a large cemetery due to cholera, was cut off from İstiklal Street and Taksim districts, as well as the cemeteries near Galata and Tepebaşı. For this reason, the Europeans called the cemeteries near Galata and Tepebaşı "Petit Champ des Morts", that is, "Small Cemetery", and the cemeteries

in and around Taksim "Champ des Morts", that is, "Great Cemetery". The burial grounds of each nation were located in the cemetery. The area allocated for the Greeks was the area extending from Parmakkapı Street to Taksim and from there to Talimhane Square. The area going from the area we use as Gezi Park today to Harbiye was allocated to the Armenians. The area on the left, advancing from Taksim to Cihangir, was reserved for the cemetery of the Latins. The area from Ayaspaşa to Dolmabahçe and the area from Taksim to Kasımpaşa were reserved for the cemetery of Muslims (https://www.mimarizm.com/gezi-mekan/sehrin-en-buyuk-mezarligindan-ulkenin-en-onemli-merkezine-taksim_115990).

The cemetery, which was reserved for Muslims, was called Ayazpaşa Cemetery because it was built on the foundation land of Ayaz Mehmed Pasha, one of the viziers of Suleiman the Magnificent (Marmara, 1999).

2.1. Physical and Functional Structure of Taksim Square Before the Republic

Taksim district got its name from the "Maksem" ("distribution place") structure. The construction of Maksem started in 1732 and was completed in 1839. At the end of the 18th century, Beyoğlu had expanded to Maksem by the road connecting Pera to Taksim (with the border drawn by Grande Rue de Pera or today's Istiklal street). The first work that brought development to Taksim square was Maksem, a water building. With the increase in the population in the northern and western parts of Istanbul, water shortages occurred in Galata, Beşiktaş, Beyoğlu, the shores of the Bosphorus, and Kasımpaşa. The transmission lines built since the 16th century could not meet the water needs of the increasing population over time. In order to solve the water scarcity problem, Mahmut I had a 25-kilometer long transmission line and Maksem and distribution network of this transmission line built.

The main water source of Istanbul is the Belgrad Forest and water was coming from the Belgrad Forest for Maksem. The incoming water was stored in Maksem and distributed to Kasımpaşa, Beyoğlu-Galata, Fındıklı-Tophane districts via the Distribution Network, that is, “Taksim”. Over time, the word Taksim became the name of the Water Network, the District, and later the Square (Gülersoy, 2003; Akın, 2011; Çelik, 2015 & Kuban, 2011).

The word Maksem is an Arabic word derived from the word 'maksim'. It means “the place where the water is divided into branches”. Maksem used to distribute the water coming through the transmission line to the fountains or public fountains in the city. After some storage, the water carried to the garden was distributed to the canals, pools, and fountains by the Maksem transmission line.

The octagonal pyramid made of Maksem Kufeki stone has an octagonal plan and at the same time octagonal pyramid. It was a water building in the classical Ottoman style, covered with a shaped roof (Campbell, & Boyington, 2018) (Photo 1).

Photo 1. *Taksim Maksem, (early 1900s)*
https://sehrinhikayesi.com/taksim-maksemi

Maksem is used as Istanbul Metropolitan Municipality Information Center (Photo 2) and the water tank right behind it is used as Taksim Cumhuriyet Art Gallery. Although it is a monumental building, its existence is not very clear today because it is at the corner of the square and has lost its function.

***Photo 2**. Istanbul Metropolitan Municipality Information Center (October 2022)*

The cemetery was established next to Maksem for Muslim and non-Muslim inhabitants of Pera until the 17th century. Barracks were built on the part of the cemetery in 1806. This was during the renewal and modernization period of the Ottoman military system, and the building was a part and a symbol of this change. The Italian writer Edmondo de Amicis, in his book about his Istanbul trip in 1874, called the Artillery Barracks in the Maghreb style of the Turkish renaissance, in a rectangular shape, with the Golden Crescent of Sultan Mahmud on it, a door with graceful columns, protruding galleries, small windows decorated with coats of arms and arabesques. describes the building (Amicis, 1993).

Military barracks built between Taksim and Maçka in the 1780s were Taksim Artillery Barracks, Mecidiye Barracks (ITU Taşkışla building), and Gümüşsuyu Barracks. Military barracks created a new look in urban space with their spatial size and architecture. The barracks, which were built in the countryside where Maksem was located in 1780 to train artillerymen and artillerymen within the scope of modernizing the artillery class within the scope of the reforms in the military field initiated by the empire, were called Taksim Artillery Barracks or Halil Pasha Artillery Barracks in the historical process. The modernization policies of the Ottoman Empire made Taksim one of the most sought-after spots in Istanbul.

The Artillery Barracks, built in 1806 and renovated during the reign of Abdülmecit in the middle of the 19th century, pointed to the importance of Taksim in the urban morphology of Istanbul. Mecidiye and Gümüşsuyu Barracks and Gümüşsuyu Military Hospital were large-scale structures built in the Taksim district during the last period of the Ottoman Empire. Taksim Artillery Barracks was built in wood by Sultan Abdulhamid I for the artillery class of the Ottoman army in the area we know today as Gezi Park (Üzümkesici, 2010) (Photo 3).

***Photo 3.** Taksim Artillery Barracks*
https://www.wikiwand.com/en/Taksim_Military_Barracks

Taksim Artillery Barracks is the second work that brought development to Taksim square. It is a 19th-century barracks. The Artillery Barracks had a rectangular plan, close to a square, with a large courtyard in the middle (Photo 4).

Photo 4. *Artillery Barracks*
https://www.turanakinci.com/eskiler/taksim-topcu-kislasi/

The Armenian Cemetery, located behind the artillery barracks and extending to Harbiye, was surrounded by walls. At that time, France and the Kingdom of Sardinia, known as Italy today, bought lands from Taksim and its surroundings to bury their soldiers who were martyred in the Crimean War. The Great Cemetery in and around Taksim was established due to the cholera epidemic and abandoned because of cholera. In 1865, a major cholera epidemic had begun in Istanbul. In the cholera epidemic, not only the people of Istanbul but also the sultan and his relatives died from cholera in the palace. For this reason, it was forbidden to make burials in the Taksim region, where the settlements began to concentrate. Cemeteries were given to Armenian and Greek communities in Şişli, where there were no settlements at that time (Dadyan, 2015).

The artillery barracks lived their most glorious days during the modernization of the Ottoman army between 1860 and 1870. Officers trained in Europe and experts brought from the west gave lectures in the barracks. They were training in the large courtyards of the barracks. The artillery barracks were destroyed in the 31 March incident. When the Republic was founded, the government could not find the financial strength to repair the Artillery barracks. The façade of the building remained as it was, but the side buildings that formed the square had been emptied. The artillery barracks had become very neglected. The barracks were not used during World War I. During the First World War, Istanbul was occupied by the French in 1918.

After the occupation, the French named the barracks Makmahan Barracks. The barracks were arranged as a stadium where English and French soldiers played football matches during the occupation years of Istanbul. Later, the barracks, which were emptied by the occupation forces, were also used to organize horse races. Taksim Barracks, whose function changed completely between 1909-1923, was used as a stadium until it was demolished in 1940 (Üzümkesici, 2010).

2.2. Physical and Functional Structure of Taksim Square After the Republic

The period from the proclamation of the Republic of Turkey to the end of the Second World War, namely the Early Republican Period, is a period of "foundation and institutionalization" in terms of Turkey's national identity. The most important examples of this identity are architectural and urban arrangements. Urban arrangements are planned to be the representation spaces and the visible face of the cultural revolutions. Architectural elements reflecting a modern national discourse and urban landscape were used in the planning of urban spaces, and it was aimed to create a common social memory with spatial and symbolic representations.

The planning of urban spaces was first started in 1927 when the main street of Beyoğlu, Cadde-i Kebir, was renamed and Istiklal Street was built. The process of creating a square started by placing the Republic Monument, which is thought to be the symbol of the Republic, in the area between Maksem and the Artillery Barracks. When Taksim is mentioned in the 1930s, the monument built in 1928 comes to mind first. Taksim, which had been a rural plain until then, became a "city square" after the construction of this monument. Taksim Republic Monument was made by Italian sculptor Pietro Canonica. Canonica stated that the statue will not only describe Atatürk's personality but also symbolize the War of Independence and the Republic. Taksim, which had been a rural plain until then, became a "city square" after the construction of this monument and became one of the most important public places in modern Turkey. The political and social aspect of this monument is as important as their urban meaning. Taksim Monument is the symbol of a new era in Turkish history. The Harbiye aspect of the monument (Photo 5) of which Canonica uses all

four sides animates the August 30 Victory and Atatürk's Kocatepe pose. Galatasaray direction (Photo 6) represents the Republic of Turkey. İsmet İnönü and Fevzi Pasha are in the middle with Atatürk's civilian clothes on both sides (Gülersoy, 2003).

Photo 5. *Harbiye Aspect of the Monument (October 2022)*

Photo 6. *Galatasaray Aspect of the Monument (October 2022)*

It was taken into account that there might be crowded groups of people in front of the monuments, and the landscaping of the monuments was made accordingly in the settlement planning and design of the monuments built in the Republican period. Taksim Republic Monument shows the first example of this. The circular landscaping of the monument (Photo 7) was done by Giulio Mongeri.

Photo 7. *Pedestal and Environment of the Monument*
https://www.researchgate.net/figure/Taksim-Square-Republic-Monument-1970s-Image-courtesy-of-SALT-Kemali-So-ylemezog-lu_fig1_347809451

The Crystal Casino (Photo 8) was located on the upper floor of a two-story semi-circular building on the north side of Taksim Square. The Crystal Casino, which defines Taksim square with the monument, continued its existence until 1960.

Photo 8. *The Crystal Casino*
http://www.eskiistanbul.net/2607/taksim-meydani-kristal-gazinosu#lg=0&slide=0

French city designer Henri Prost is appointed as Istanbul's Chief Planner in 1936. Prost is the founder of urban studies in France. Taksim Square and its surroundings has planned by Henri Prost. The planning made by Prost at that time has reached the present day by guiding the planning of Istanbul (Aydemir, 2008).

Prost's first major project in Taksim was to create a public promenade. Artillery Barracks was demolished with the Beyoğlu plan, which he prepared as a regional plan. The Topçu barracks became derelict and the huge courtyard of the barracks began to be used as a football field in the 1930s. This led to the construction of a modern park and promenade named after İsmet İnönü, who became the President of Turkey after the death of Mustafa Kemal Atatürk in 1938. And so, instead of the Topçu barracks, İnönü Gezisi, today's Taksim Gezi Park, was built (Tekeli, 2013). The Christian Cemetery in Taksim was moved and the first public park in Istanbul was designed in its place in 1864. The İnönü Trip covered an area of 62,000 square meters and represented a truly modern western-style park with tree-lined walkways, grass areas, benches, and venues designed for the recitals of the Municipal Philharmonic Orchestra. Maçka Park and a football stadium were built in 1947 on the northeast of the İnönü Trip and also an open-air theater was built in 1946.

The State Radio Hall was built in 1945, the Sports and Exhibition Center was built in 1949, and modern apartments along the tree-lined Cumhuriyet Avenue connected Taksim Square to the Nişantaşı district in the north. These new works gave life to the modern district, where the seeds of a secular society were planted. Therefore, Taksim has become the most important urban space in Istanbul, where official celebrations and Republican urban planning principles are showcased, just as Times Square is used as a participatory public space in New York (Makagon, 2003). Taksim Municipality Casino (Photo 9) was built in Taksim Garden, the cemetery next to it was removed, apartment blocks were built, and Tennis Fencing and Mountaineering Club and Radio House were opened. Today, the Intercontinental (Ceylan Hotel) is located at the place where Taksim Municipality Casino is located. In the place where the Tennis, Mountaineering, and Fencing Club building is located, there is the Divan Hotel today.

Photo 9. *Taksim Municipality Casino*
https://twitter.com/hayalleme/status/1214422662308515840/photo/1

The design of Gezi Park was made by Henri Prost and the architects working in Istanbul Municipality. The design process of the park took about 3 years. The opening of Gezi Park was made by the Mayor of the time Dr. Lütfi Kırdar in 1943. Taksim Gezi Park, with its public space, ceremonial and monumental space, and symbolic space, also has the feature of being an important "cultural asset" and is the representation of the culture and urban understanding of the early Republican period (Tekeli, 2013).

Gezi Park has functioned as a memory place and has become a place that contributes to the urban and environmental identity with its adoption in the common memory of its inhabitants as a living space of different periods (Photo 10). It plays an important role in determining the spatial identity of Taksim.

Photo 10. Taksim İnönü Trip (1944)
https://www.eskiistanbul.net/2879/taksim-inonu-gezisi-kasim-1944-fonds-henri-prost

The importance of Taksim and its surroundings continued with the construction of important buildings in the 1950s and 1960s, which were built to reflect the new political and social order. The most important of these was the Istanbul Hilton Hotel, which was built in 1956 on the north side of the İnönü Trip. Designed by the American architectural firm Skidmore, Owings, and Merrill and the famous Turkish architect Sedad Hakkı Eldem, the building was an early and outstanding example of post-war International Style architecture in Turkey. Beyond its stylistic character, the Istanbul Hilton symbolized the growing American influence in Turkish politics after the Second World War (Atmaca Çetin et al., 2019) (Photo 11).

Photo 11. *Hilton Hotel (1956) (Atmaca Çetin et al., 2019)*

The first internationalist proposal for Taksim Square, which was included in the Henri Prost plan, was to build an opera house. Theaters and opera houses were central features of 19th-century European urban planning and were considered essential components of a modern city. Prost wanted an Opera House to be located in Taksim Square as it represents contemporary urban life. There was a mansion whose Edouard Huguen who was the first General Manager of Haydarpaşa Train Station, at the place where Taksim City Opera will be built in 1940 (Yıldırım Okta, 2017) (Photo 12.)

Photo 12. *Edouard Huguen's Mansion*
https://www.herumutortakarar.com/hugnen-kislik-evi/#uael-gallery-2

The mansion was demolished in 1946. A monumental building is designed by August Perret in Taksim Square. However, with the start of the Second World War, the opera house project could not be made. In the following years, Rüknettin Güney and Feridun Kip prepare a new project in line with the plans of August Perret. When Lütfi Kırdar was the mayor and governor of Istanbul in May 1946, the construction of the building began (Photo 18). However, this project couldn't be done due to financial difficulties (Ganiç, 2016).

Hayati Tabanlıoğlu completed the project by sticking to the master plan prepared by Perret in 1960 and the building became operational under the name of Istanbul Culture Palace in 1969. However, one year after the opening of the Istanbul Cultural Palace, a fire broke out during Arthur Miller's play, Witch Cauldron, and the building became unusable. The repair of the building continues for 3 years. It was opened under the name "Atatürk Cultural Center" in 1978. Atatürk Cultural Center, besides being the center of cultural life, is one of the most important examples of social memory in the city. The activities of Atatürk Cultural Center were stopped in 2009, it was demolished in 2018. The new building was designed by Murat Tabanlıoğlu, son of Hayati Tabanlıoğlu, and the New AKM (Opera Building) was opened on October 29, 2021.

Tarlabaşı Boulevard was opened as an artery connecting the Historic Peninsula to Taksim between 1984-1989. The opening of Tarlabaşı Boulevard caused the demolition of many historical buildings and a social

transformation (Photo 13). With the opening of Tarlabaşı Boulevard, the users of Taksim square and the region changed and were isolated from Taksim Square (Yıldırım, & Erdem, 2015).

Photo 13. *Demolition Works for the Opening of Tarlabaşı Boulevard*
https://twitter.com/hayalleme/status/1141602834426814464/photo/1

Taksim Square Pedestrianization Project was prepared in relation to the rearrangement of Taksim Square in 2011. According to the Taksim Square Pedestrianization Project, vehicles were removed from the square and taken underground. However, the coexistence of pedestrians and vehicles on the streets feeding Taksim Square was an important dynamic that determined the identity of Taksim Square. In the past, pedestrians and vehicles coexisted seamlessly in Taksim Square (Photo 14). The Taksim Square Pedestrianization Project has taken the vehicle traffic underground but has removed the spatial identity of Taksim square.

Photo 14. *Taksim Square (1972)*
http://www.eskiistanbul.net/767/taksim-kartpostali-salt-istanbul-soylemezoglu-arsivi#lg=0&slide=0

3. EVALUATION AND CONCLUSION

Taksim Square was shaped as a city square in the Republican period and as the largest open space of the Beyoğlu district, which has survived to the present day, it meets the recreational needs of the people of Istanbul. When we evaluate Taksim square from past to present; after the artillery barracks collapsed, it witnessed some important events such as the Janissary revolts. When social events are mentioned, Taksim Square comes to mind first. Taksim square has been the scene of important social and political events with the Republic monument and the surrounding area. And it can gather thousands of people together. However, Taksim Square has been reorganized in a way that no demonstrations can take place today, and it continues to be organized.

Places affect social memory. Social events that occur in the same place are remembered differently by different age groups. Even if there is any change in the appearance of the places, they are preserved by the social memory due to the first perception of the place (Halbwachs, 2018).

The city is also the space of collective memory like the relationship between memory and object (Rossi, 2006). Lefebvre said that space is socially produced and is a work. Cities are also spaces of socially constructed, political, and economic systems. The city is the collective memory of its inhabitants (Lefebvre, 2020).

Social groups add meaning to the past by bringing together the events they have experienced and forming the whole. Taksim Square is a square used by all social groups, living every hour of the day, symbolizing the Republic and representing freedoms. After the construction of the Republic Monument, Taksim became an urban square where ceremonies and demonstrations were held on national holidays and national or political events. May 1, 1977, is one of the most critical events in Taksim Square's collective memory: Spaces that are strong in terms of collective memory and worthy of "social memory" have value and meaning beyond their physical existence. Taksim Square was closed to mass demonstrations, rallies, and marches after 1980 due to the bloody end of the events during the 1 May 1977 demonstrations. Even though it has been transformed from the past to the present, it will continue to maintain the traces of past information or image in the social memory as long as it exists. This indicates that social memory is permanent and that societies can always make the past permanent through their memories.

Identity is closely linked to memory: both our personal memories and our collective or social memories are linked to the histories of our families, neighbors, and compatriots (Uludağ et al., 2005).

Even if Taksim Square changes or transforms, it carries the traces of the society it contains, while at the same time it has a social meaning. While Taksim Square is a sharing area where the differences and social layers, social memory, cultural and historical values, and identity of Istanbul are revealed verbally and visually, with the implementation of the pedestrianization project, access to the square has been restricted and the square has turned into a concrete mass (Photos 15).

Photo 15. Taksim Square (October 2022)

Important old buildings such as Gezi Park, Atatürk Cultural Center, The Marmara Hotel, Intercontinental Hotel, and also a new building Taksim Mosque Building form the borders of Taksim square. Taksim was built in the area used as a parking lot behind the water tanks of the new Mosque Maksem (Photo 16).

Photo 16. *Taksim New Mosque Building (October 2022)*

Taksim Square, despite all its physical changes, has indisputably taken its place in the social memory as the place of freedoms and prohibitions, especially the Monument of the Republic, for all ages. Despite social changes and physical interventions, Taksim Square is one of the most important public open spaces in Istanbul, whose centrality in the urban structure is accepted by individuals of all ages and should be protected.

Taksim Square, in its historical process, has become a place that positions itself at the center of various projects. Taksim Square, which hosts many demolitions and constructions, is on the verge of a change. These changes have led to the gradual disappearance of the historical city memory that Meydan has in the global world. A large part of the space that defines the memory in Taksim Square is threatened with extinction due to the changes made from the past to the present. All kinds of changes made in Taksim square also affect the memory of the citizens.

As a result, Taksim Square, which is accepted as the focal point of Istanbul, is an important result of the modernization project of Istanbul, which took place within the scope of the reconstruction of cities after the proclamation of the Republic. The Republic Monument is a symbolic public space together with Gezi Park, which was brought to life with Prost's plan, and Atatürk Cultural Center, which was built in later periods. Taksim Square is also an important public open space, which has taken its place in urban and social memory, where holidays, festivities, social joys, and reactions are given. It is seen that the gathering function, which is the most important feature of Taksim Square, has begun to disappear with its current structure. Thus, the role of Taksim Square in social memory began to shift to different places. Although the place of Taksim Square, which is the most important public open space in Istanbul, in the social memory has changed from past to present, it has historical, political, social, and physical functions.

REFERENCES

Akın, N. (2011). Galata ve Pera, Literatür Yayıncılık, İstanbul.

Amicis, E. De. (1993). İstanbul (1874), Türk Tarih Kurumu Yayınları, Ankara.

Atmaca Çetin, H., Tuna Ultav, Z., & Uz, F. (2019). Reflections of the Istanbul Hilton Hotel on Mid-century Hotel Buildings in Turkey. Art-Sanat, 12, 57–88.

Aydemir, I. (2008). İki Fransız Mimarı Henri Prost ve August Perret'nin İstanbul ile İlgili Çalışmaları. MEGARON YTÜ Mim. Fak. E-Dergisi, 3 (1), 104-111.

Blockmans, W. P. (2003). Reshaping cities: the staging of political transformation. Urban History, 30 (1), 7-20.

Campbell, J.W.P. & Boyington, A. (2018). Fountains and water: the development of the hydraulic technology of display in Islamic gardens 700–1700 CE. Studies in the History of Gardens & Designed Landscapes, 38 (3), 247-267.

Crane, S. A. (1997). Memory, distortion, and history in the museum. History and Theory, 36 (4), 44-63.

Çelik, Z. (2015). 19. Yüzyılda Osmanlı Başkenti Değişen İstanbul, (çev.) Selim Deringil, Türkiye İş Bankası Kültür Yayınları, İstanbul.

Dadyan, S. (2015). Şehrin En Büyük Mezarlığından Ülkenin En Önemli Merkezine, Taksim.

Retrieved March 15, 2022, from https://www.mimarizm.com/gezi-mekan/sehrin-en-buyuk-mezarligindan-ulkenin-en-onemli-merkezine-taksim_115990.

Ganiç, K. (2016). Kentsel Yapıtlar Üzerinden Bir Mekânsal Bellek Okuması: Atatürk Kültür Merkezi (AKM), İstanbul Teknik Üniversitesi Fen Bilimleri Enstitüsü, Yüksek Lisans Tezi, İstanbul.

Gül, M. (2012). The emergence of modern Istanbul: transformation and modernisation of a city. London: IB Tauris.

Gül, M., Dee, J., & Özdemir, C. N. (2014). Istanbul's Taksim Square and Gezi Park: the Place of protest and the ideology of place. Journal of Architecture and Urbanism, 38 (1), 63-72.

Gülersoy, Ç. (1986). Taksim Bir Meydanın Hikâyesi, İstanbul, Beyazıt Devlet Kütüphanesi.

Gülersoy, Ç. (2003). Beyoğlu'nda Gezerken, Çelik Gülersoy Vakfı Yayını, İstanbul.

Halbwachs, M. (1992). On Collective Memory, University of Chicago.

Halbwachs, M. (2018). Kolektif Hafıza, (çev.) Banu Barış, Heretik Yayıncılık, İstanbul.

Hussein, F., Stephens, J., & Tiwari, R. (2020). Cultural Memories for Better Place Experience: The Case of Orabi Square in Alexandria, Egypt. Urban Science, 4 (7), 1-14.

Kuban, D. (2011). İstanbul Bir Kent Tarihi, (çev.) Zeynep Rona, Türkiye İş Bankası Kültür Yayınları, İstanbul.

Lefebvre, H. (2020). Mekânın Üretimi, (çev.) Işık Ergüden, Sel Yayınları, İstanbul.

Marmara, R. (1999). Büyük Mezarlık: Ayaspaşa Mezarlığı, İstanbul.

Makagon, D. (2003). A search for social connection in America's town square: Times square and urban public life. Southern Communication Journal, 69 (1), 1-21.

Nora, P. (2006). Hafıza Mekânları, (çev.) Mehmet Emin Özcan, Dost Kitabevi. Ankara, 2006.

Rossi, A. (2006). Şehrin Mimarisi, (çev.) Nurdan Gürbilek, Kanat Yayınevi, İstanbul.

Tekeli, İ. (2013). İstanbul'un Planlanmasının ve Gelişmesinin Öyküsü, Tarih Vakfı Yurt Yayınları, İstanbul.

Uludağ, Z., Çağlar, N., & Tuna Ultav, Z. (2005). Conservation: Re-building an urban consciousness. Studies in the History of Gardens & Designed Landscapes, 25 (1), 23-39.

Üzümkesici, T. (2010). Taksim Topçu Kışlası ve Yakın Çevresinin Tarihsel Dönüşümü, İTÜ Fen Bilimleri Enstitüsü, Yayımlanmamış Yüksek Lisans Tezi, İstanbul.

Yıldırım Okta, B. (2017). Urban Transformations in Istanbul During The Term of Mayor Cemil Topuzlu. METU JFA, 34 (1), 1-19.

Yıldırım, B., & Erdem, A. (2015). Taksim Meydanı'nın Cumhuriyet'in Kamusal Alanı Olarak İnşası, Tasarım Kuram, 11 (19), 95-106.

Retrieved March 2 2022, fromhttp://www.eskiistanbul.net/2607/taksim-meydani-kristal-gazinosu#lg=0&slide=0

Retrieved March 05, 2022, from https://www.timeturk.com/tr/2013/06/09/taksim-deki-musluman-mezarligini-kim-yok-etti.html

Retrieved March 5, 2022, from https://www.wikiwand.com/en/Taksim_Military_Barracks

Retrieved March 10, 2022, from https://www.researchgate.net/figure/Taksim-Square-Republic-Monument-1970s-Image-courtesy-of-SALT-Kemali-So-ylemezog-lu_fig1_347809451

Retrieved March 15, 2022, from https://twitter.com/hayalleme/status/1141602834426814464/photo/1

Retrieved March 20, 2022, from https://sehrinhikayesi.com/taksim-maksemi/

Retrieved March 20, 2022, from https://twitter.com/hayalleme/status/1214422662308515840/photo/1

Retrieved March 25, 2022, from https://www.herumutortakarar.com/hugnen-kislik-evi/#uael-gallery-2

Retrieved August 10, 2022, from https://www.turanakinci.com/eskiler/taksim-topcu-kislasi/

Retrieved August 10, 2022, from https://www.eskiistanbul.net/2879/taksim-inonu-gezisi-kasim-1944-fonds-henri-prost.

Retrieved August 15, 2022, from http://www.eskiistanbul.net/767/taksim-kartpostali-salt-istanbul-soylemezoglu-arsivi#lg=0&slide=0

ADAPTIVE SPATIAL PRACTICES: DESTABILIZATION OF DICHOTOMIES OF URBAN INFORMALITY IN THAILAND

ADRIAN LO

Adrian Lo, International Expert, Faculty of Architecture and Planning, Thammasat University, Bangkok, Thailand

ABSTRACT

As the world rapidly urbanizes, with an expected seven billion people living in cities by 2050, some three billion people will be living in informal settlements. As costs of private housing increase, low-income urban dwellers are forced to live in slums or informal settlements on the outskirts of the city, unplanned and built spontaneously, existing outside of legality, state control and authorities, such that they lack land security and durability. This prevalence of informal settlements is due to various forces, including rapid urbanization, ineffective planning and policies, lack of affordable housing particularly for the urban poor, as well as the perpetuity of poverty and low incomes.

Moreover, some 50% of urban employment is found in the informal economy, particularly for citizens in the Global South, whose work and everyday practices contribute to a contentious yet vibrant urbanism. Though seen by some as a blight to the city, the products and services of these informal workers demonstrate how they are the lifeblood of the city.

Thailand has made much progress towards addressing the situation of the urban poor through bottom-up community secure housing programs as well as top-down initiatives for upgrading informal settlements. Although these actions are effective in 'reactively' managing the urban issues after they arise, they do not 'preventively' solve the real challenge of the prevalence of slums or squatter settlements in the first place. This research rethinks urban informality and asks how can cities promote inclusive and sustainable urban practices, particularly for the urban poor thus allowing them to participate as citizens? The paper investigates different design tactics of channeling the creative and adaptive capacities of urban low-income and poor communities in the Global South and how they can create spaces for themselves, allowing them to exercise their right to the city.

By harnessing architectural and urban design strategies of self-help housing and upgrading, this research seeks to destabilize conventional dichotomies between the formal and informal, learning from informal urban ingenuity through case study analyses, both in-practice and in educational pursuits. The outcomes of the case studies, ranging from Thailand's Baan Mankong or secure housing program to academic urban design studios conducted during the 2021-2022 academic year at Thammasat University, Thailand, demonstrate how necessity creates its own internal logics which may look chaotic from an outsider, but highly systematized and orderly from within, challenging formal design solutions to informal issues.

In the everyday lives of those living in informal settlements or conducting work in the informal economy, it is possible to see their appropriations not as a juxtaposition of illegal vs legal, informal vs formal but more as a continuum or even the destabilization of such oppositions. This research aims to understand an alternative logic to formal practices, in the form of an informal urban ecology, whereby complexity, contradictions, community, and coherency are commonplace.

In the ever rapidly globalizing and urbanizing world, informal settlements should not be perceived as anomalous and stigmatized, but rather as integral to the formation of cities. Through human-centric policies and design strategies, informal settlements can begin to be accepted, understood, and improved, not in the traditional dichotomous terms, but as something that blurs the formal and informal, as part of the complex everyday life of cities. To enhance the value of urbanization, informal practices can be an essential resource to address poverty rather than exacerbate it, through collaborative co-design between governments, local authorities, and communities.

INTRODUCTION: URBAN INFORMALITY

Currently more than half of the world's population live in urban areas, this is expected to increase to 68% by 2050 (United Nations, 2018). As the world continues to urbanize, with an expected seven billion people living in cities by 2050, some three billion people out of a projected world population of nine billion will be living in informal settlements, slums or inadequate housing (Pieterse, UN-Habitat worldwide, 2014; UN DESA, 2013). There have been two waves of urbanization: the first was in the Global North, which reached 52% urban in 1940, which was when the second wave of urbanization in the Global South started. Urban population in the Global South increased rapidly from 18% (309 million) in 1950 to a projected 56% (3.9 billion) by 2030 (Pieterse, UN-Habitat worldwide, 2014). It is expected that the Global South will take 80 years to do what took 200 years for the Global North, but at a much larger scale (Pieterse, UN-Habitat worldwide, 2014).

The continual rise of housing prices fuels suburban sprawl where people find more affordable options further away from central urban areas, whilst the urban poor may have little choice but to live in slums located at the perimeter or in the liminal spaces of the city, under the constant threat of eviction (UN-Habitat, 2020). Moreover, some 50% of urban employment is found in the informal economy, which is the lifeblood of many citizens in the Global South, whose work and everyday practices contribute to a contentious yet vibrant urbanism. Thailand has made much progress towards addressing the issue of informal settlements and slums through both bottom-up and top-down housing initiatives. Although they are effective in managing the issues after they arise, they do not prevent the prevalence of slums in the first place.

This research paper asks how can cities promote inclusive and sustainable urbanism, particularly for the urban poor thus allowing them to participate as citizens? The paper explores different design tactics of channeling the creative and adaptive capacities of urban low-income and poor communities in the Global South to create spaces for themselves, thereby allowing them to exercise their right to the city.

By harnessing architectural and urban design strategies of self-help housing and upgrading, this research sought to destabilize conventional dichotomies between the formal and informal, learning from informal urban ingenuity and case study analyses. The outcomes of the case studies, both in-practice and academic design studios, demonstrate how necessity creates its own internal logics which may look chaotic from an outsider, but highly systematized and orderly from within, challenging formal design solutions to informal issues.

INFORMAL SETTLEMENTS

According to the United Nations, globally 1.6 billion people are currently living in inadequate housing, with one billion people residing in informal settlements or slums (UN-Habitat, 2020). Slums, as defined by the UN Department of Economics and Social Affairs, are urban areas with substandard housing and services, such that they are deprived of one or more of five conditions, including: access to improved water sources, access to improved sanitation, sufficient living areas, security of tenure, and housing durability (UN DESA, 2020).

Figure 1. Khlong Toei is the largest informal settlement in Thailand, situated in the heart of Bangkok

Urban inequalities have been exacerbated in recent decades due to the lack of state intervention in the regulation of the private residential market and overlooking the importance of affordable or public housing (UN-Habitat, 2020). As costs of private housing increase, low-income urban dwellers are forced to live in slums or informal settlements on the outskirts of the city, the in-between or marginal spaces which have not yet been fully developed (UN-Habitat, 2020). Informal settlements are typically developed spontaneously in an unplanned manner, existing outside of state control and authorities, and are known for their high density, congestion, poor hygienic and environmental conditions, and perceived as chaotic or messy (Kamalipour, 2016a; Carracedo Garcia-Villalba, 2015).

Further to illegally squatting on the margins of society, as unplanned clusters of non-permanent structures, informal settlements are typically self-built houses made from scrap materials such as wood or corrugated iron, and lack a formal building permit thereby making them unauthorized or illegal constructions (Kamalipour, 2016a; Yap & De Wandeler, 2010). Moreover, settlements built near the coast, rivers, or other water bodies, are prone to natural hazards, particularly floods and heavy rain in the South-East Asian region.

The many forces driving the prevalence of slums include rapid urbanization, ineffective planning and policies, lack of finance and affordable housing particularly for the urban poor, as well as the perpetuity of poverty and low incomes (UN-Habitat, 2020). The growth of informal settlements accompanying extraordinary urbanization in Asia and Africa are "*taking place at such unpredictable rates that urban growth has become synonymous with slum formation*" (UN-Habitat, 2012, p. 3).

Urban informality, as both process and product, as well as simultaneous modes of production and regulation of spaces in insurgent practices often occur through the state of exception (Kamalipour & Peimani, 2020; Sweeting, 2017). Informal settlements emerge organically and incrementally in a self-organized way, yet informality is a norm rather than the exception, whether it be housing or economic activities in the Global South (Kamalipour, 2016a; UN-Habitat, 2020). Rather than seen as places of illegality and disorder, informal settlements can also display ingenuity, livelihood, and vibrant habitation (Kamalipour, 2016a).

Figure 2. Informal settlement in Nonthaburi province, Thailand

OPPOSITIONAL JUXTAPOSITIONS: ORDER WITHIN DISORDER

Carracedo Garcia-Villalba describes, "*However, a careful analysis of these marginal areas shows an underlying order and a 'spontaneous' hierarchy, which are non-obvious at first sight*" (Carracedo Garcia-Villalba, 2015, p. 166). Given an historical case in Hong Kong, the now demolished Kowloon Walled City is a vertical example of this phenomenon (high-rise high-density informal cluster), which showed what appears to be messy or disorderly on the outside could contain its own internal logic and order (Lo, 2021).

Conventional language to describe informal settlements are typically set up as binary oppositions or dichotomies: formal/informal, planned/unplanned, legal/illegal, order/disorder, systematic/messy, organized/chaotic. Kowloon Walled City and other informal settlements and practices could show how these dichotomies have become destabilized through their hidden systems concealed by a facade of apparent chaos, a kind of oppositional juxtaposition of systematic disorder or organized informality achieved through the agency of an informal urban ecology (Lo, 2021). Occurring through the state of exception, urban informality transforms the Latin maxim, *Necessitas legem non habet*, that is, necessity knows no law, to necessity produces its own or another kind of law (Sweeting, 2017).

When considering the everyday lives of those living in informality, it is possible to see their appropriations not as a juxtaposition of illegal vs legal, but more as a continuum or even break down of the oppositions, where there are systems at work, but not the conventional ones we are used to. An ecology is formed based on an alternative logic, an informal urban ecology of mixed use shop-houses and facilities, where seemingly disparate socio-economic activities could take place side-by-side, constituting a tight-knit community. The urban low-income communities thereby have a strong social capital, employing low-cost, environmentally sustainable practices, in their making of the city (Yap & Leeruttanawisut, 2017).

INFORMAL ECONOMY

In 2020, more than two billion people earned their livelihoods in the informal economy, making up 62% of the world's workforce, such that the informal economy is indeed the lifeblood of many, particularly those in low-income developing countries, where some 90% are employed informally (UN-Habitat, 2020; Chen et al, 2018). Constituting more than half of all non-agricultural employment in most developing regions, informal employment makes up specifically 65% of the East and South-East Asian workforce (UN-Habitat, 2020).

Figure 3. Street vendor in Chinatown, Yaowarat Road, Bangkok, Thailand

To further understand the informal economy, some definitions according to the International Labour Organization (ILO) are useful to make some key distinctions. Firstly, the 'informal sector' is defined as work and production in unincorporated and non-registered enterprises. Secondly, 'informal employment' is defined as work that is unregistered and unregulated, lacking legal or social protection, secure contracts, worker's benefits or representation. Thirdly, the 'informal economy' takes into account both the informal sector and informal employment, defined as all economic activities not covered (partially or fully) by formal arrangements (ILO, n.d.).

Chen *et al* aptly puts, "*Informal employment and informal economic activities are the norm, not the exception, in cities across the global South*" (Chen et al, 2018, p. 49). Informal economic activities are found in all sectors of the urban economy ranging from manufacturing to construction, trade to transport, to waste picking, and even domestic work (Chen et al, 2018).

Street vending and informal transport play a prominent role in the informal urban economy and mobility all over the global South, particularly in South and South-East Asian countries, as they provide income generating opportunities for the urban poor. By filling in the gaps left by formal developments, street vendors, for instance, can provide a variety of low-cost goods and services in accessible and convenient localities, through negotiation and appropriation of urban public spaces (Chen et al, 2018; Kamalipour & Peimani, 2020).

Most informal workers operate in unconventional workplaces, such as public spaces, and may also face restrictions in its use, such that they must improvise and contend for their use in pursuit of "*their livelihoods by finding and filling gaps in the use of public space, both temporal and spatial*" (Chen et al, 2018, p. 8). A dramatic example is the Maeklong Railway, a railway station just outside Bangkok, which serves as a vendor market except for the times when the vendors quickly remove their goods and equipment from the railway tracks to allow a train to pass through (Chen et al, 2018). Urban space is appropriated and co-produced by workers of the informal economy following an internal logic and order which may benefit their businesses, but may nevertheless be stigmatized from the state or an outsider as disorderly (Chen et al, 2018).

Just as public spaces are vital to informal workers, open common spaces back in informal settlements are also critical to the livelihoods of the households, where the narrow passageways are needed for storage of vending carts or motorbikes, or may have a shop or other commercial or even industrial activity fronting onto this street (Usavagovitwong et al, 2013). Typically informal settlement houses combine residential, commercial, and rental spaces into a kind of 'shophouse' for home-based commercial businesses (Usavagovitwong et al, 2013).

Figure 4. Shophouses in Khlong Toei informal settlement, Bangkok, Thailand

In contrast, the National Housing Authority's (NHA) top-down public housing projects, which are supply-driven, are typically more vertical and high-rise in built form to accommodate a larger number of households in one block, but loses the open common spaces on the ground level which are much needed for homeowner-operated commercial activities and social interaction (Usavagovitwong et al, 2013). Hence, housing improvements of informal dwellers need to consider the social, economic, and educational aspects, as well as open-spaces for informal sector, income-generating work and livelihoods of low-income groups (Usavagovitwong et al, 2013).

Figure 5. National Housing Authority's (NHA) public housing in Khlong Toei, Bangkok, Thailand

CASE STUDIES: SOLUTIONS AND INFORMAL ADAPTATIONS

Thailand not only has top-down solutions to informal settlements, but has also successfully implemented bottom-up demand driven-approaches such as the Baan Mankong (Secure Housing) program operated by the Community Organizations Development Institute (CODI). This is a participatory approach towards upgrading informal settlements based on collective savings, ownership, and implementation. According to Somsook Boonyabancha, the former director of CODI, before Baan Mankong, people lived under the constant threat of eviction, "*the only concept was to push slums and squatter settlements out of*

the city....without addressing these poor communities' legal status or with their contravention of various by-laws" (Boonyabancha, 2006, p. 3). Consequently, the key principle of CODI's Baan Mankong initiative is the change of land tenure status, as a way of formalizing the informal, which fundamentally changes the relationships between the informal settlement communities and the city authorities, by accepting and legimating the urban poor and low-income communities as being part of the city (Boonyabancha, 2006). Baan Mankong is a bottom-up, people-oriented, community upgrading initiative, whereby the community, as the collective owners of the project, are the main actors in the participatory decision making process from the design to its implementation (Boonyabancha, 2006; Usavagovitwong et al, 2013). Communities take responsibility as a collective to manage repayments of flexible soft low-interest loans for the construction of houses or purchase of the land, administered by representatives of a community savings group (Boonyabancha, 2006; CODI, 2005; Usavagovitwong et al, 2013).

The CODI Baan Mankong program has five main strategies of upgrading informal settlement communities, which are: 1) on-site upgrading, 2) reblocking, 3) land sharing, 4) reconstruction and 5) relocation. The first approach, on-site upgrading, means to improve the physical environment and basic services whilst keeping its location, character, and social structure (CODI, 2005). The second approach, reblocking, refers to the systematic improvement of the building cluster/s of the existing community by realigning the streets and blocks, along with the installation of sewers and drains, improving the paths for walking and roads, without moving too many houses (CODI, 2005).

The third approach, land sharing, is whereby the community negotiates with the landowner for sharing the land, through division and purchasing or renting part of the land for housing (re)construction, and in exchange the landowner could develop the remainder of the land for commercial or public purposes (CODI, 2005). The fourth approach, reconstruction, is whereby existing settlements are totally demolished and rebuilt on the same site under a long-term lease or even outright land purchase (CODI, 2005). Like the reblocking approach, the new development could have new street and block layouts to optimize the land and infrastructures (Carracedo Garcia-Villalba, 2015).

Lastly, the fifth approach is relocation, which applies when on-site reconstruction or land sharing is not possible. There is both nearby relocation for sites less than three kilometers of the original settlement or relocation to sites further away beyond three kilometers, however, the trade-off is that distant sites have housing security and land use rights (CODI, 2005).

Figure 6. Baan Mankong, Pathum Thani model as an example of relocation onto government purchased land, Thailand

STREET-LED SLUM UPGRADING

A key challenge of dense informal settlements is not so much the limited quantity of public spaces, as many have narrow walkways or passages connecting to the front of each house, but rather the limitations

in the quality of public open spaces. Hence, a key part of the design solutions of CODI Baan Mankong developments is the street as public space, where neighbors can gather for social interactions and meetings.
As part of the city-wide informal settlement improvement program of Baan Mankong, the implementation of streets, whether through realignment of blocks or newly created, allows for better optimization of the land as well as the setting of infrastructure. According to Carracedo Garcia-Villalba, this "*defines the physical environment of the neighborhood, which helps to develop the sense of community and promotes social relationships and local economies. It is not the physical space in itself, but what that physical space can create*" (Carracedo Garcia-Villalba, 2015, p. 178).

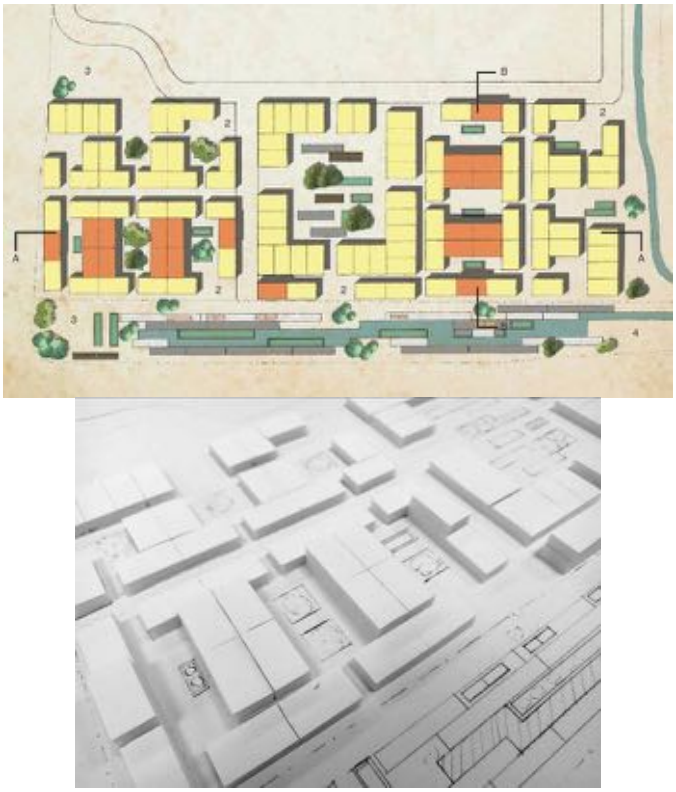
Figure 7. A public open space and common area in Khlong Toei informal settlement, Bangkok, Thailand

As a worked example of a Baan Mankong style project at its early stages, the Informal Settlement Improvement project of the UD222 Design Thinking Studio of the first year, Urban Design and Development International (UDDI) program, conducted in the second semester of 2021-22 academic year (Faculty of Architecture and Planning, Thammasat University, Thailand), shows how public spaces are a key factor to the proposed regeneration of a community. This project, which had both group and individual components, was based on a real life scenario in collaboration with CODI's Baan Mankong initiatives.
Students analyzed and proposed alternative spatial improvement solutions for an existing informal settlement, the Bang Si Muang community, in Nonthaburi province, Thailand. The key focus of this project was the street or courtyard as urban commons, a public space serving the residential neighborhood. This project allowed the students to engage in public space design in the context of an actual informal residential building cluster, which was then proposed to the community. The proposals were developed based on an understanding of the problems and opportunities posed by the site identified through analyses and field research.

Figures 8-9. Site Analysis and Photograph, Bang Si Muang, Nonthaburi, UD222 Design Thinking Studio

With one of the main roles of urban design being to shape and define public spaces, not as the leftover spaces between buildings, but rather as the positive open spaces framed by the negative volumes of the buildings, this studio emphasized the primacy and importance of public space design. In the students' proposed masterplans to improve the informal settlement community, space is primary, defined by the built form, and allows for social-economic communal activities to take place, whether it be interacting with neighbors, children playing, informal food vending, or simply the drying of clothes. Public common spaces allow the informal to coexist with the formal, disorder with order, redefining the formal-informal and planned-unplanned continuum.

The design scheme by Apisara Ngamwongnoi, which adopted a combined land sharing and reconstruction strategy, employs the design principle of a part-to-whole relationship featuring large and small courtyards framed by the houses. The whole masterplan has one large courtyard, and each part has its own smaller courtyard for social interactions. The plan is composed of a mixture of one- and two-storey houses, totalling 132 units.

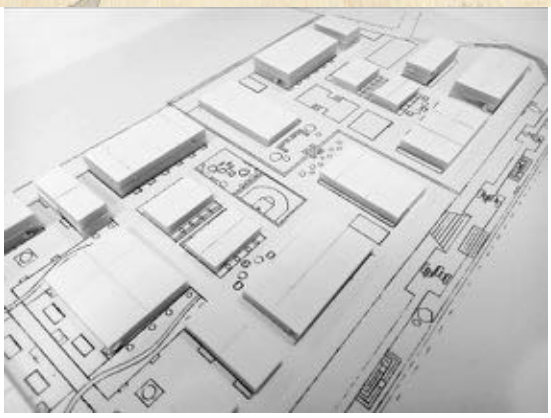


Figures 10-11. Apisara Ngamwongnoi, masterplan and model, UD222 Design Thinking Studio, 2022

In Pawanakorn Laparojkit's scheme, there is an organized hierarchy of open spaces ranging from large to medium to small and multiple possibilities in-between, including walkable passages. The diverse scale and location of open spaces gives the masterplan an eventful yet highly interconnected quality, whereby the narrow spaces suddenly expand into courtyards or larger pockets contract into walkways between buildings. The volumetric richness of the plan is also seen in the section and elevation where there is a variation between one-, two-, and three- storey houses, totalling 118 units.

Figures 12-13. Pawanakorn Laparojkit, masterplan and model, UD222 Design Thinking Studio, 2022

Yuka Kojima's scheme is composed of a large courtyard connected to smaller pockets at the corners, which resembles the letter 'H'. These inner courtyards of different sizes allow the community to use these spaces for several purposes such as laundry, playground, and sunbathe, thus encouraging social inclusion. The central larger open space could also foster commercial activities. Each house is directly connected to an open space, and with multiple entry passages into this scheme, various flows of people's movements are created to encourage chance encounters. The whole scheme is set back from the canal and there are two types of houses in terms of shape, though their area is the same, totalling 114 units.



Figures 14-15. Yuka Kojima, masterplan and model, UD222 Design Thinking Studio, 2022

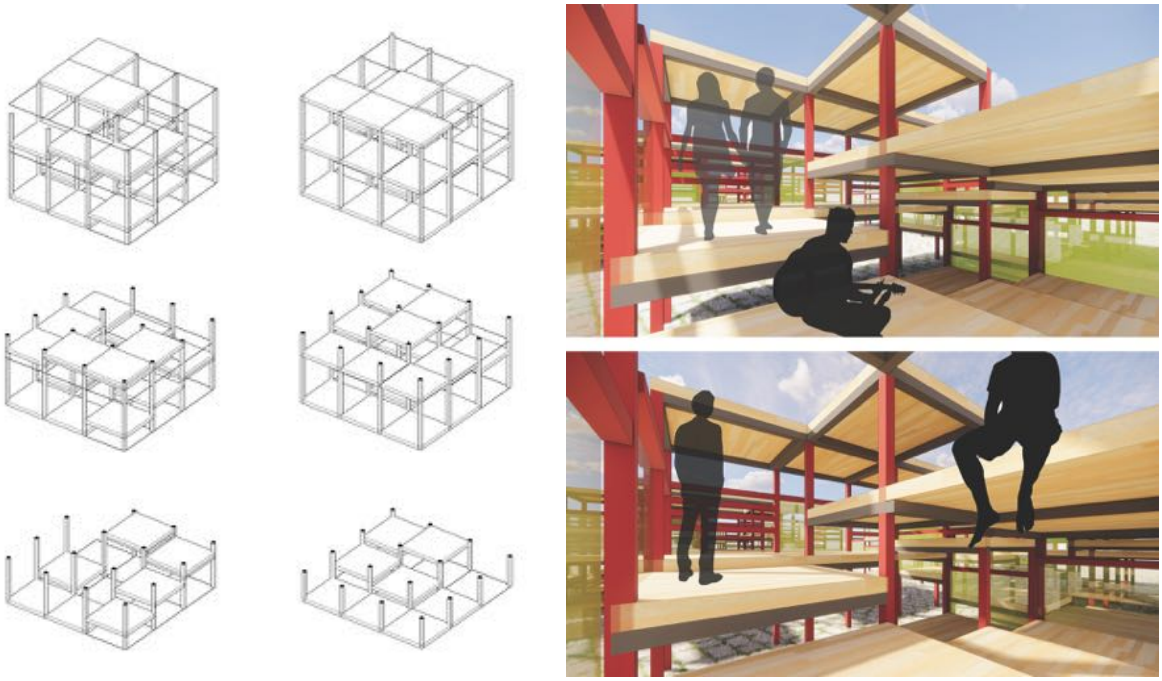
In summary, Thailand has made leaps forward in addressing the issues of the urban poor through top-down government programs as well as bottom-up community secure housing approaches to improve the informal settlement situation. The government NHA housing provides formal housing for low-income citizens, whereas the Baan Mankong initiative formalizes the land ownership and legal status of informal communities with on-site upgrading or relocation strategies. Although these initiatives are effective in 'reactively' managing the urban challenges after they arise, they do not 'preventively' solve the real issue of the prevalence of slums or squatter settlements in the first place (Yap & De Wandeler, 2010; Sweeting, 2017).

INTEGRATING FORMAL AND INFORMAL

Another solution is to integrate the formal with the informal. For instance, Pritzker Prize winning architect Alejandro Aravena, developed social housing in Iquique, Chile, which challenged the need to build a smaller house of 40sqm in the face of economic limitations, and opted for building the frame of a larger 80sqm house. The architect designed half of the house which was built, and allowed for the families' own building capacities and creative expressions to take over once they saved enough money to build the other half by themselves.

As a further extension to this idea of creating a formal frame in which informality fills in after, is Karin Kalinta's architectural intervention project which was conducted as part of the UD223 Urban Intervention Studio of the UDDI second year, in the first semester of 2021-22 academic year (Faculty of Architecture and Planning, Thammasat University, Thailand). Inspired by the Japanese architect Sou

Fujimoto, the alternative proposed here involves creative and incremental adaptations by the users over space and time.
Like Fujimoto's House NA, Karin's proposal for an open-ended structural system of 'sticks-and-planes' implies the provision of formalized structures and platforms in which users strategically create their own space according to the usage, whether it be social-economic activities, or even residential. It could work as a shop-house with commercial on ground and accommodation above, or be totally commercial or residential, hence blurring informal and formal settlements and economy. Creative adaptation means the platforms can interchange, suggesting flexibility, mobility, and incrementality.



Figures 16-17: Karin Kalinta, adaptive informal structures, UD223 Urban Intervention Studio, 2021

As seen in the figures, the proposed system allows for potential movement and variable activities. Though appearing as a conventional two storey structure, the platforms and frames work together to create an ever-changing assembly. The users are provided with this system, but they can transform it according to their needs, something between process and product. Communities can build upon these structures, challenging and destabilizing formal and informal, planned and unplanned dichotomies, constituting a form of organized chaos.
In effect, this becomes a way to formalize the informal whilst simultaneously informalizing the formal. Formally, the structures are legal and systematic, yet they allow for informal and spontaneous adaptations. This spatial informality, typical of cultural spatial practices in Asia, is whereby space is not predefined by function, but rather by people's creative solutions, displaying the innovative and original spatial adaptations found in existing informal settlements.
As demonstrated in these case studies, by harnessing architectural and urban design strategies, this design research sought to mediate the threshold and continuity between the formal and the informal, learning from the dynamic, innovative, ingenious, and self-organized adaptations from informal urban practices and relationships (Choo, 2018; George, 2018). The outcomes show how necessity creates its own internal logic which may look disorderly from an outsider, but highly systematized and coherent from within, challenging formal design solutions to informal issues.
As enshrined in the United Nations New Urban Agenda (NUA) and the Sustainable Development Goals (SDGs), the principle of leaving no one and no place behind involves enabling all inhabitants living in both formal and informal settlements to share the benefits of urbanization, lead dignified lives, and achieve their full potential. The projects and case studies presented here, particularly in the creation of quality public spaces and adaptive structures for the urban poor or low-income communities and their economic livelihoods can help to address SDG 1 of ending poverty, SDG 3 of promoting good health and well-being, SDG 8 of encouraging self-sustaining economic activities, SDG 10 of reducing inequalities, SDG 11 of producing sustainable cities and communities, and last but not least, SDG 17 partnerships for the goals involving communities, CODI, local authorities, and academia.

CONCLUSION - DESTABILIZATION OF DICHOTOMIES

In the everyday lives of those living in informal settlements or conducting work in the informal economy, it is possible to see their appropriations not as a juxtaposition of illegal vs legal, informal vs formal but more as a continuum or even the destabilization of such oppositions (Philip, 2018). This research aims to understand an alternative logic to formal practices, in the form of an informal urban ecology, whereby complexity, contradictions, community, and coherency are commonplace.

In conclusion, in the ever rapidly globalizing and urbanizing world, informal settlements should not be perceived as anomalous and stigmatized, but rather as integral to the formation of cities. Through human-centric policies and design strategies, informal settlements can begin to be accepted, understood, and improved, not in the traditional binary or dichotomous terms, but as something that blurs formal/informal, planned/unplanned, order/disorder, systematic/chaotic oppositions, as part of the complex everyday life of cities (Boonyabancha, 2006). To enhance the value of urbanization towards the goal of a sustainable urban future, informal practices can be an essential resource to address poverty rather than exacerbate it, through collaborative co-design between governments, local authorities, and communities (UN-Habitat, 2020; Kamalipour, 2016a).

REFERENCES

Allen, S., 2009. From Object to Field: Field Conditions in Architecture and Urbanism. In M. Hensel et al (Eds.), *Space Reader: Heterogeneous Space in Architecture*. Hoboken, N.J: John Wiley, pp.118-143.

Aravena, A., 2014. *My architectural philosophy? Bring the community into the process* [Video]. TED Conferences.
https://www.ted.com/talks/alejandro_aravena_my_architectural_philosophy_bring_the_community_into_the_process?language=en#t-326328

Boonyabancha, S., 2006. Community Organizations Development Institute (CODI). How Upgrading of Thailand's Informal Settlements is Spearheading a Community-driven, City-wide, Integrated Social Development Process. Conference Paper. Retrieved from
https://en.codi.or.th/wp-content/plugins/download-attachments/includes/download.php?id=852

Carracedo Garcia-Villalba, O., 2015. The Form Behind the Informal: Spatial Patterns and Street-Based Upgrading in revitalizing Informal and Low Income Areas. *Great Asian Streets (Asian Urban Places)*: 167-181.

Chen, M., Harvey, J., Wanjiku Kihato, C., Skinner, C., 2018. *Inclusive Public Spaces for Informal Livelihoods: A Discussion Paper for Urban Planners and Policy Makers*. Manchester, UK: WIEGO.

Choo, C., 2018. Why Do We Need to Learn about Informality? In I. Kucina (Ed.), *Architectures of Informality*. Dessau, Germany: DIA, Graduate School, Anhalt University of Applied Sciences, pp.52-58.

CODI., 2005. *Baan Mankong: An update on city-wide Upgrading in Thailand*. Community Organizations Development Institute (CODI).

George, J., 2018. Are Informal Settlements Boon or Bane?" In I. Kucina (Ed.), *Architectures of Informality*. Dessau, Germany: DIA, Graduate School, Anhalt University of Applied Sciences, pp.42-49.

International Labour Organization (ILO), 2022. 4.5 Informal economy workers.
Retrieved from https://www.ilo.org/global/topics/wages/minimum-wages/beneficiaries/WCMS_436492/lang--en/index.htm

Kamalipour, H., 2016. Forms of Informality and Adaptations in Informal Settlements. *International Journal of Architectural Research: ArchNet-IJAR* 10: 60-75.

Kamalipour, H., 2016a. Urban Morphologies in Informal Settlements. *Contour Journal*, 1(2): 1-10.

Kamalipour, H., Peimani, N., 2020. Informal Urbanism in the State of Uncertainty: Forms of Informality and Urban Health Emergencies. *URBAN DESIGN International* 26: 122-134.

Lo, A., 2021. Unexpected Juxtapositions: Hong Kong's Informal Urban Ecologies. In M. Milocco Borlini and A. Califano (Eds.), *Urban Corporis X - Unexpected*. Conegliano, Italy: Anteferma Edizioni, pp. 248-259.

Philip, J., 2018. Why Is the Coexistence of Formal and Informal Important? In I. Kucina (Ed.), *Architectures of Informality*. Dessau, Germany: DIA, Graduate School, Anhalt University of Applied Sciences, pp.82-86.

Sweeting, D., 2017. *The informal city and rights in South East Asian Cities: the cases of Kampung Improvement Programme and Baan Mankong*. University College London, Development Planning Unit, The Bartlett.

UN DESA, 2013. *World Economic and Social Survey 2013: Sustainable Development Challenges*. New York: UN Department of Economics and Social Affairs (UN DESA).

UN DESA, 2020. *World Social Report 2020: Inequality in a Rapid Changing World*. New York: UN Department of Economics and Social Affairs (UN DESA).

UN-Habitat, 2012. *Streets as Tools for Urban Transformation in Slums: A Street-Led Approach to Citywide Slum Upgrading*. Nairobi, Kenya: United Nations Human Settlements Programme (UN-Habitat).
UN-Habitat, 2016. *The New Urban Agenda*. Retrieved from http://habitat3.org/wp-content/uploads/NUA-English.pdf
UN-Habitat, 2020. *The World Cities Report 2020: The Value of Sustainable Urbanization*. Nairobi, Kenya: United Nations Human Settlements Programme (UN-Habitat).
UN-Habitat worldwide, 2014, April 22. *Edgar Pieterse - How can we transcend slum urbanism in Africa?* [Video]. YouTube. https://www.youtube.com/watch?v=quhfgiZBfeA&t=421s
Usavagovitwong, N., Pruksuriya, A-O., Supaporn, W., Rak-u, C., Archer, D., Mcgranahan, G., 2013. *Housing Density and Housing Preference in Bangkok's Low-income Settlements*. London: International Institute for Environment and Development.
Yap, K. S., De Wandeler, K., 2010. Self-help housing in Bangkok. *Habitat International - HABITAT INT.* 34: 332-341.
Yap, K. S., Leeruttanawisut, K., 2017. *Informal Settlements in Bangkok: Origins, Features, Growth and Prospects*. Retrieved from https://www.academia.edu/28672364/Informal_Settlements_in_Bangkok_Origins_Features_Growth_and_Prospects

EVALUATION OF THE URBAN PLANNING PROCESS IN TERMS OF SUSTAINABILITY

BERNA ÜSTÜNDAĞ DİKİCİ, AYŞEGÜL TERECİ

Faculty of Architecture, KTO Karatay University

ABSTRACT

The continuous growth of cities due to increasing industrialization and technological development and the spread of the city towards the peripheries threaten natural resources and increase the burden of living beings on the ecosystem. It is impossible to increase natural resources, but some natural resources can be renewed. Therefore, it is necessary to plan sustainable cities in order to control growth and ensure healthy urbanization compatible with ecological structure.

Biotic and abiotic natural environmental factors such as topography, soil properties, hydrology, climate, vegetation, geological structure, etc. are important in the planning phase of sustainable cities. At the same time, land-based problems can be reduced, energy can be used efficiently, environmental problems can be prevented and the existing order in the ecosystem can be preserved. Thus, sustainable life can be created with the concepts considered at the urban planning stage. Since the city is a part of nature, it is necessary to pay attention to the efficient and measured use of natural resources, considering future generations, in land use decisions. One of the main objectives of planning is to maintain the hierarchy between the individual, society and the environment in order to protect and improve environmental quality, and to ensure the continuity and renewability of natural resources.

Keywords: Sustainability, Urban Planning, Suistainability Cities

INTRODUCTION

As a result of increasing requirements and technological advances, throughout history cities have been the place of developments and changes to lead a more comfortable life.

As from the 1300's, towns and cities were beginning to expand with commercial revolution, but rural exodus has gained another dimension with industrial revolution, and it has showed dramatic increase due to the education and business opportunity in the middle of 20th century. In line with modernity and mechanization, the break in cultural context, changes in the social life and economic system played an important role in shaping the city and architecture (Pitts, 2004).

After the 17th and 18th centuries, following the Western countries where urbanization increased with industrialization, other countries that reached the economic development process in the 20th century also entered the urbanization phase rapidly.

It has been concluded that the situation cannot be sustained for future generations at the point where consumption has increased critically, resources are consumed unconsciously, the natural environment and other living things are ignored, cultural values and social relations are lost.

Especially the sustainability of cities has become an issue that concerns all countries of the world and new approaches have been started to be produced to ensure sustainability.

Apprehensions about economic development and the damage done by industry to nature were expressed for the first time in international politics at the Stockholm Conference (1972) by gathering different countries under one roof, and then the idea of 'sustainable development' was put forward with the Brundtland Report (1987). With the conferences held later on (Rio Summit and Agenda 21 (1992), UN Conference on Human Settlements-Habitat II (1996), UN Millennium Summit (2010), Rio+20 Summit (2012)) the idea of sustainability for the protection of the environment rather than economy-centered development was suggested.
In this context, urban life has become the center of sustainability discussions. The reason for this is that cities are the most important consumer of natural resources and the largest producer of polluting waste. At the beginning of the 19th century, only 3% of the world's population lived in cities, but today this figure has reached 50%. In addition, about 10% of this population lives in megacities with a population of more than 10 million. According to the estimates of the International Energy Agency, 70% of the world's energy consumption takes place in cities (https://www.iea.org/topics/world-energy-outlook). In addition, 80% of CO_2 emissions takes its source from cities. According to the assumption of the United Nations, by the middle of this century, 62% of the world's population will live in cities. In line with this foresight, with the increase in the amount of energy required for life in cities, both the consumption of natural resources and the tenfold increase in waste and pollution production compared to today, , it will be inevitable that environmental pollution will increase at the same rate (Girardet, 1992).
The concept of sustainable cities has been suggested to prevent the increasing problems arise due to the impact of urbanization day by day and to provide the living standards desired by the society. The goal of sustainable cities is to ensure daily life, while minimizing the use of natural resources and waste generation (Çiğdem Varol, 2005). Within the scope of this study, firstly, it is aimed to explain the concepts of sustainability and sustainable urban planning and to present approaches and principles for sustainable urban planning.

SUSTAINABILITY

With the increase in environmental deformation, one of the issues that gain more and more importance day by day in our lives is the concept of sustainability. The most widely used definition of the term of sustainability is "the use of natural resources to meet the needs of today's people without limiting the needs of future generations" (Brutland Report, 1987).
According to Tekeli (2001), sustainability is a concept defined as “a moral principle that emerges within the environmental movement, is widely accepted, and whose content is constantly tried to be redefined in the political process”. According to Çakmanus and Özbalta (2008), "Efficiency of systems burning fossil-based fuels and the use of renewable energy sources are tried to be increased in order to reduce negativities such as increasing emissions and other wastes, decreasing natural resources, increasing air and water pollution, and deterioration of ecological balance. This process is defined as sustainability." According to another definition, which is an expression that guides planning, sustainability aims to meet social, economic, and environmental needs without leaving a negative trace for future generations (Oktay, 2007).
Sustainability is possible by balancing economic, environmental, and social factors in harmony. Social sustainability is created by ensuring the continuity of the processes developed to support the cultural and social life of people. It is necessary to create a suitable environment for social participation in the improvement of people and places. Social sustainability can be achieved by developing mechanisms that promote people’s health and well-being by providing equal opportunities and access to resources. Economic sustainability relates to policies that support long-term economic growth in the developing world without compromising the quality of life and without adversely affecting the social, environmental, and cultural aspects of the community. Environmental sustainability is the process of ensuring that the natural environment is not affected or destroyed while meeting the needs of people. The main objective is to protect all natural resources and relay them to future generations. The level of use of resources should not exceed the rate at which these resources can renew themselves, and the rate of pollutants emitted should not exceed the rate at which natural resources can process these pollutants. The protection of biodiversity; human health; air, water and soil quality; animal and plant life are also included in environmental sustainability. The three pillars of sustainable development are environmental protection, social equality, and economic profitability. In the "Three Pillars Model", one of the models developed for these three pillars, it is thought that a sustainable development can be achieved by working together with the three conditions of sustainability: environmental, economic, and social dimensions (Nations, 2005). Another model, called "Nested Sustainable Development", is one in which the economy is embedded in society and the economy and society are embedded in the environment. However, the environment can act independently of society and economy. In the model, it is seen that the environment is an important

input for the economic and social dimension. Another model is Rydin's model in which environmental, economic, and social processes operate simultaneously. In this model, environmental, economic, and social dimensions are symmetrically interpenetrating with equal circles and their intersection is defined as sustainability (Rydin, 2002).
Sustainability comes to the forefront as a guiding boundary in the planning of living spaces with its capacity to develop protective and preventive policies in environmental, economic, cultural, spatial, and social areas and to create action plans. The reason for the sustainability policies to impress in urban areas rather than rural areas can be listed as the high population density in the city and the effectiveness of the administrative powers in this area. Sustainable measures developed as a solution to increasing problems in urban areas are primarily examined in these areas (Yakupoğlu, Esmagül and Korkmaz Hasmaden, 2013). For cities, this phenomenon includes the prudent use of all cultural, social, environmental and scientific resources of the society by the citizens and a social perspective based on respect for this issue.

SUSTAINABILITY IN THE CONCEPT OF CITY AND URBANIZATION

The concept of the city is a flexible phenomenon that allows various missions to be assigned to the space on a large scale, depending on the culture and geography it has. This phenomenon is recognized as a complex and living organism that is constantly undergoing change. Contrary to its apparent complexity, the urban organism is a living being that lives together with simple symbolic ties and has the potential to create its own progress with reference to itself (Jacobs, 1961).
Cities are cramped forms that have been able to collect the products of civilization and transfer them to the next generations since the beginning of their formation, allowing the maximum services required by the society to be provided in a minimum volume. This form has a structure that can grow with the changing needs of the people and the more complex shapes brought about by development in a way that can make room for accumulated social values. In other words, the urban city, which is a strong image of a complex society, is a unique space that embodies changes. Segregation is impossible in the city, which makes room for different identities, classes, traditions, professions, and strata (Alver, 2012).
Unlike the traditional cities of the past, in today's modern cities, the habits of using space and time have changed and become systematic. While cities, which are partly inherited from the past and partly built by adding new layers, also determine the way of social life to a significant extent in the same process; they are examined as a contrasting context that opens space for thoughts and actions and draws boundaries at the same time. Therefore, it can be stated that the unity with the city and urban life is dialectical (Canatan, 2012). For this reason, one of the important tasks of the city is to support the conscious participation of human beings in historical and cosmic processes. On the other hand, the concept of urbanization can be defined as the increase in the number of people living in cities and the number of cities with the orientation of a certain amount of population to urban areas because of the increase in non-agricultural production and the diversification of production-distribution unity (Tekeli, 2011). Urbanization is defined as the growth of existing cities in terms of population and area on the one hand, and on the other hand, the growth of settlements such as towns, villages, etc. and their transformation into cities and the increase in the number of existing cities (Nadaroğlu, 1996). Economic and technological developments have accelerated industrialization and the development of industrialization has accelerated urbanization. Along with industrialization, the phenomenon of urbanization has also created a new dimension. Although these two concepts show a parallel development, when urbanization precedes industrialization, difficult economic, social, and environmental problems occur. (Alkan, 1991). Depending on the acceleration of the urbanization process, the growth in cities also accelerates. The inadequacy and lack of infrastructure, accommodation and some urban services, as well as being unprepared for the rapid population growth of the cities, cause the inadequacy of meeting some of the needs of the people who migrated from the village to the city. In such a situation, illegal structures or slums emerge on the edge of the city. In other words, the city must find a way out of various problems (housing, unplanned and irregular urbanization, land, development problems, population, etc.) over time (Alkan, 1991).
At this point, urbanization has both positive and negative aspects. First, urbanization helps economic development and creates strong communication centers where modern technologies can be used. However, when it is not planned in a certain order, it can create a mechanism that can reduce the quality of life, lead to environmental problems and cause problems between society. At this point, it becomes increasingly difficult to ensure the continuity of urban areas. Sustainability emerges as an important fact in every context related to the city to ensure the continuity of cities for those living in the city and future generations.

SUSTAINABLE CITIES AND URBAN PLANNING

Cities are plagued by many problems such as poverty, exclusion, insecurity and environmental degradation, and urban planning plays a key role in solving these problems. Ensuring sustainability in urban planning is the solution to tackle these problems. Sustainable urban planning has become the subject of many different disciplines such as architecture, engineering, environmental science, transportation, technology, economic development, and finance. As seen in Figure 1, sustainable urban planning is a multidimensional and layered process.

Figure 1 Sustainable Urban Planning Model
Source: (Tang ve Lee, 2016) drawn by the author using the source)

A sustainable city is defined as "a city in which socio-economic interests are harmonized with environmental and energy concerns in order to achieve change in sustainability " (Geenhuisan and Nijkamp, 1998). In this direction, Wheeler (2003) sought to make women, the disabled, children, the elderly and other groups safe in cities and for cities to have a green, attractive, human-scaled identity. He summarized that sustainable cities are not possible, but what cities should do in terms of sustainability as follow:

- Compact, efficient land use: Protect the ecological environment, agricultural land, open spaces around the city by compacting the city with land use areas,
- Greater accessibility by reducing car use: Supporting mixed-use areas, bringing functions closer together and taking more pedestrians into account, planning bicycle routes and emphasizing public transportation,
- Efficient use of resources, less waste and pollution: Energy saving and recycling, energy-efficient selection of electrical appliances, penalties for polluters,
- Restoration of natural systems: Expanding parks and converting vacant lots and former industrial areas into parks and hobby gardens,
- Creating good housing and living spaces: Design housing and neighborhoods that provide users with easy access to open spaces, gathering areas, commerce, public transportation, etc,
- Healthy social ecology: Finding solutions for homeless people, stopping racism, caring for disadvantaged groups,
- Sustainable economy: Supporting companies that work on issues that support sustainability, such as environmental hygiene, public transportation, supporting transformation and local ownership, and the use of local resources,
- Public participation: Bringing local, regional and global sustainability to mind by engaging the public in design and local planning.

- Preserving local culture: Supporting the use of local goods by preserving traditional architecture and materials.

In terms of sustainability, cities should be examined in terms of energy, transportation, landscape planning, waste management and construction in the planning phase. Energy planning includes efforts to meet energy from renewable sources and to use it more efficiently. In transportation, public transportation should be developed to reduce carbon-based transportation, living and working areas should be more integrated, and the attractiveness of pedestrian and bicycle routes should be increased. In addition, in the organization of landscape areas, it is necessary to protect and increase the green areas in the city and to pay attention to climatic and geographical characteristics in the design of these areas. Construction decisions that will use energy efficiently and minimize consumption should be made by considering regional values in construction. Furthermore, systems that minimize waste and support recycling and utilization should be established within the city.

Sustainable urban planning can be defined as a planning approach that makes the activity of social organization effective in the decision-making process for the change and development of urban land use and takes into account social benefits , adopts the principle of preventing damage to the ecosystem by ensuring a balance between protection and utilization of resources and values in the environment during urban development, aims to protect ecological resources in urban land use hierarchy and transportation system decisions, and defines the spatial boundaries of urban development on the basis of ecological resources and values, prioritizes the cooperation between actors within the principles of transparency and broad participation at every step of the planning phase, and prioritizes the environmental-ecological approach (Geenhuisan, MV. and Nijkamp, 1994). In other words, it can be defined as a wide-ranging strategic planning approach that includes environmental, social-cultural, spatial, managerial and economic objectives aimed at the sustainability of natural values and biodiversity, ensuring the effective, efficient and economical use of energy and resources, making urban areas livable by raising urban social living standards, eliminating the negative effects of factors such as urban production, consumption and waste on environmental resources and expanding the possibility of recycling or reuse (Özcan et al., 2016).

Sustainable urban planning in this context can be summarized;

- Creating a city that future generations can benefit from,
- Evaluating the natural and artificial environment as a whole and establishing the sustainability of urban-nature development,
- Reducing the consumption of natural resources and energy.

This approach aims to increase living standards without destroying natural resources. To achieve this goal, the city should undertake a sustainable function, enrich social and cultural resources, create social and economic opportunities for the people in the city, and create an environment compatible with human health. In other words, ecological, social, spatial, and economic sustainability must be ensured to create urban sustainability (Gülersoy, N., Erkut, G. and Kılıçaslan, 1993).

For spatial sustainability, it is necessary to ensure a more hierarchical formation between urban and rural areas and a more balanced distribution of human settlement and economic activities. At this point, ecological sustainability, especially in urban planning, is defined as minimizing the damage to working systems while aiming to increase the existing carrying potential of the earth. Biotic and abiotic natural environmental factors such as topography, soil properties, hydrology, climate, vegetation, geological structure, etc. are important in the planning phase of sustainable cities. In this way, land-based problems can be reduced, and healthy construction can be ensured, the protection of productive lands can be supported, energy can be used efficiently and the chains in the ecosystem can be protected. Economic sustainability, on the other hand, is to ensure efficient use of resources and sustainability in private and public investments. It is considered as social development beyond economic investment and the profitability of the investor. For social sustainability, it is necessary to regulate the imbalance in living standards and income distribution between people.

Similar principles in the literature on sustainable planning are as follows (Newman, P., & Jennings, 2008):

- Supporting diversity, density and mixed use, planning walking intervals,
- Reducing greenhouse gas emissions with electric vehicles by emphasizing cycling, public transportation, and walking,
- Finding solutions to reduce traffic,
- Designing cities with a strong identity and a developed sense of place,
- Protect and enrich water, air, soil, and biodiversity,
- Using renewable resources,
- To create a cycle in the urban metabolism in a balance of input-output for eco-efficiency,
- Achieve self-sufficiency by growing and producing food in proximity.

All these principles can be realized through long-term strategies, agreed processes, public education, policy reform, the setting of indicators and performance standards, and the creation of new relevant institutions and departments.

CONCLUSION

The acceleration of the urbanization process in the world with increasing migration from rural to urban areas has brought along serious environmental problems in the urban structure and in the areas surrounding the city. With the short-term solutions to the problems arising from the urbanization process, cities have developed in an irregular and uncontrolled manner. What should be done is urban planning on a human scale and respectful to human beings, considering the past of the people, responding to their needs today and in the future, with a long-term, environmentally protective attitude and developing urban awareness.

In the sustainable urban approach, it aims to improve the ability of rapidly consumed environmental resources to renew themselves, to prevent the perception that if these resources are depleted, they can be found elsewhere in the world, and to prevent the consumption of resources in the immediate vicinity of the city. Urban sustainability is not only about improving the environmental quality of the city around itself, but also about reducing and preventing the damage caused by environmental problems to the future, other ecosystems, and people. The respect to be shown to future generations in today's values will strengthen the existence of sustainable cities. Since the protection of the natural environment is under the common responsibility of all countries, the creation of solutions can only be possible with a participatory understanding.

As a result of physical plans made without taking into account natural resources, natural values are being destroyed and their carrying potential is strained and they become unrenewable. In order not to jeopardize the living spaces of both present and future generations, natural resources must be used judiciously. This can be achieved by protecting natural resources and ensuring ecological balance, considering and monitoring the communication between land use and natural resources, which should be done at the planning stage but is always neglected. As Mahatma Gandhi puts it, " Earth provides enough to satisfy every man’s needs, but not every man’s greed If we consume more than we need, we are either eating each other's rights, borrowing from the future, or destroying the environment and other living things."

REFERENCES

Alkan, A. (1991). “Şehir, Şehirleşme ve Aile”, Türk Aile Ansiklopedisi. Türkiye Yazarlar Birliği Vakfı, Birim Basın-Yayın Organizasyon,Ankara, : 960-967.

Alver, K. (2012). KENT İMGESİ. https://www.academia.edu/9536243/kent_imgesi adresinden erişildi.

Çakmanus, İ. ve Ö. T. (2008). Binalarda Sürdürülebilirlik: Ömür Boyu Maliyete İlişkin Çalışmalar. İstanbul: Doğa Sektörel Yayın Grubu.

Canatan, K. (2012). Batı Kenti, Kent Sosyolojisi. Hece Yayınları, Ankara.

Çiğdem Varol, G. Ü. (2005). Sürdürülebilir Kentsel Gelişme İçin Planlama: Kastamonu Örneği. Journal of Forestry Faculty, Gazi Uni.-Kastamonu, 5(1).

Geenhuisan, MV. and Nijkamp, P. (1994). Sürdürülebilir kenti nasıl planlamalı? Toplum ve Bilim Dergisi, 64– 65: 129–140.

Girardet, H. (1992). The Gaia Atlas of Cities: New Directions for Sustainable Urban Living, Gaia Boks Limited. London.

Gülersoy, N., Erkut, G. ve Kılıçaslan, T. (1993). Sürdürülebilir Gelişme ve Paralelinde Çevre Duyarlı Kent Planlama Yaklaşımları ve Bazı Ülkelerden Örnekler, 2000’li Yıllara Doğru Türkiye’de Kent Planlama Uygulama Sürecinin Değerlendirilmesi ve Yeni Yaklaşımlar Semineri, İller Bankası Genel Müdürlüğü, 146.

Jacobs, J. (1961). The Death and Life of Great American Cities. New York: Random House.

Keleş, R. (2004). Kentleşme Politikası. İmge Kitapevi, Ankara.

Nadaroğlu, H. (1996). Mahalli İdarelerin Yeniden Yapılandırılması. TOBB Yayınları, İstanbul.

Nations, U. (2005). Resolution adopted by the General Assembly on 16 September 2005 60/1. 2005 World Summit Outcome.

Newman, P., & Jennings, I. (2008). Cities as sustainable ecosystems principles and practices. Washington DC: Island Press.

Oktay, D. (2007). Sürdürülebilirlik, Yaşanılabilirlik ve Kentsel Yaşam Kalitesi. Mimarlık Dergis, 335, 19,.

Özcan, K., Üniversitesi, P., Ve, M., Fakültesi, T., Ve Bölge, Ş. ve Bölümü, P. (2016). Kent Planlamada Sürdürülebilirlik Gündemi: Bir Kavramsallaştırma Denemesi. Eurasscience Journals Geliş Tarihi: 1 Mayıs, 4(2), 7–17.

Pitts, A. (2004). Planning and Design Strategies for Sustainability and Profit : Pragmatic Sustainable Design on Building and Urban Scales. Oxford UK: Taylor & Francis Ltd.
Rydin, Y. (2002). In pursuit of sustainable development: rethinking the planning system.
Tang, H. T. ve Lee, Y. M. (2016). The Making of Sustainable Urban Development: A Synthesis Framework. Sustainability 2016, Vol. 8, Page 492, 8(5), 492. doi:10.3390/SU8050492
Tekeli, İ. (2001). Sürdürülebilirlik Kavramı Üzerine İrdelemeler, (Ankara: Mülkiyeliler Birliği Yayınları.), Prof. Dr. Cevat Geray'a Armağan (729-746).
Tekeli, İ. (2011). Kentli Hakları Kentleşme ve Kentsel Dönüşüm Yazıları (2.Bölüm), İlhan Tekeli. Toplu Eserler.20, Tarih Vakfı Yurt Yayınları, İstanbul, 2011.
https://www.academia.edu/35467529/Kentli_Hakları_Kentleşme_ve_Kentsel_Dönüşüm_Yazıları_2_Bölüm_İlhan_Tekeli_Toplu_Eserler_20_Tarih_Vakfı_Yurt_Yayınları_İstanbul_2011 adresinden erişildi.
Yakupoğlu, Esmagül ve Korkmaz Hasmaden, F. (2013). "Sürdürülebilir Ekolojik Yerleşmelere Örnek Olarak Freiburg Şehri. 25. Uluslararası Yapı ve Yaşam Kongresi.
Wheeler, S. (2003). "Planning Sustainable And Livable Cities". The City Reader, 3rd Edition, (eds.) LeGates, R.T. ve Stout, F., Routledge Urban Reader Series, New York, 487–496.

SAFEGUARDING HISTORICAL AND NATURAL SITES BY IDENTIFYING THE DIRECTION OF DEVELOPMENT OF CITIES; A CASE STUDY: QOM, IRAN

BITA KHATERIZADEH

Bita Khaterizadeh, MA, Student of Restoration and Conservation of Historic Buildings and Urban Heritage, Tehran University of Art, Tehran, Iran.
bitakhaterizadeh@gmail.com

ABSTRACT

Indiscriminate development of the cities has made safeguarding and conserving the cities' cultural heritage and natural sources the main challenging concerns of the experts. One of the first ways to encounter this problem is to study the direction of the development of the cities. The first visible anomalies are the historical and cultural regions around the cities, which are endangered due to the cities' economic and population developments. The aim of this paper is to provide an integrated method to control urban development and protect historical cities and their surrounding valuable sites. To do this, we will provide a coherent complementary method to improve the accuracy of the city development through the integration of the city's development through a review-analytical method. The source of information for this study includes historical texts, remote sensing images, and other bibliographical information. The overall design perspective will be introduced based on the zoning divisions and Markov chain. Our case study is Qom city, located in the south of Tehran, Iran. The city is developing rapidly and contains numerous archaeological sites dating to different periods. In this paper, we are to suggest considerations to control the accuracy in identifying the direction of the development of this city. The most important of the city will be assigned by this method at the time of planning of the city to preserve the most historical and natural sites around possible during its urban development.

Keywords
Safeguarding, Historical sites, Natural sites, Urban development, Qom City.

INTRODUCTION

Over the last few decades, the continuous increase in population and the resulting increased demand for housing have caused sudden urban expansion and non-standard changes in cities. Urban development is a dynamic and complicated process directed by biophysical and social-economic factors. Immigration, political and social factors, increased land deals, and developed transportation networks are some causes of urban development. These factors have also resulted in the construction of new unplanned buildings in some cities. During recent years and despite governmental supervision and construction prohibitions, urban expansion has been threatening the valuable lands around cities (Blasco et al. 2017). Urban expansion is necessary for accommodating new populations and the agricultural lands around cities will inevitably be destroyed. Studies and land analyses indicate a significant decrease in the expanse of agricultural lands around cities. The urban expansion also threatens the ancient sites around historical cities.

Unplanned and unstructured expansion and its negative results can cause environmental imbalances and hurt the cultural identity of cities. Therefore, the sustainable future of cities requires suitable physical infrastructure development guidelines (Rimal et al, 2018). In the 1970s, when the concept of "sustainability" was presented for the first time, urban planning was performed to conservation historical values and urban development (Pendlebury, 2005). Because sustainable urban development means preservation the city's historical features and meeting the demands of the current population without negatively affecting future generations (Hasanzadeh & Soltanzadeh, 2017). Since historical sites are considered valuable cultural and historical treasures due to long periods of dynamic social, economic, cultural, and natural interactions, protecting the valuable sites around historical cities is a part of safeguarding cultural heritages which is an internationally recognized necessity (Wang & Zhou, 2019). Historic and architectural sites shall be taken to mean any groups of buildings, structures, and open spaces including archaeological and palaeontological sites, constituting human settlements (in an urban or rural environment), the cohesion and value of which, from the archaeological, architectural, prehistoric, historic, aesthetic or sociocultural point of view are recognized (UNESCO, 1976). In 1987, ICOMOS defined "the conservation of historic towns and urban areas" as those necessary steps for the protection, conservation, and restoration of such towns and areas as well as their development and harmonious adaptation to contemporary life. Since the conservation plan should aim at ensuring a harmonious relationship between the historic urban areas and the town as a whole, they must address all relevant factors including archaeology, history, architecture, techniques, sociology, and economics.

The conservation plan should determine which buildings must be preserved, which should be preserved under certain circumstances, and which must be supported by the residents of the historic sites. Since continuing maintenance is crucial to the effective conservation of a historic town or urban area, until a conservation plan has been adopted, any necessary preservation activity should be carried out under the principles and the aims of this Charter and the Venice Charter (Charter, w, 1987).

Urban heritage (including tangible and intangible components) plays a major part in increasing the liveability of urban areas and reinforces economic development and social cohesion in a changing global environment. This recommendation addresses the need to better integrate and frame urban heritage conservation strategies within major sustainable development goals, to support public and private actions aimed at preserving and enhancing the quality of the human environment. In addition, modern conservation conventions and charters address the different dimensions of cultural and natural heritage, constitute the foundations of this recommendation, and provide the basis for a comprehensive and integrated approach toward the identification, assessment, conservation, and management of historical urban sites within an overall sustainable development framework. The historic urban landscape approach is aimed at preserving the quality of the human environment, enhancing the productive and sustainable use of urban spaces, promoting the dynamic character of urban environments, and promoting their social and functional dimensions (UNESCO, U, 2011). Documentation of the general principles of Historic landscape conservation plans is necessary. This method requires protective plans and documents to be created after different groups (Preservation and restoration experts, Art historians, Architects, and urban planners) have gathered advanced scientific studies (UNESCO, 1976). Any actions and proceedings require extensive knowledge of social, cultural, and economic procedures (UNESCO, 2011).

In conclusion, valuable areas around cities, including ancient areas and natural resources, have been threatened by immethodical development. To preserve historical cities and their valuable areas, a necessary and useful field known as "Identification of urban development direction" has been developed. This study aims at reviewing and analyzing this field's recent approaches. This field focuses on two main questions:

How to conserve valuable areas around cities against unsustainable urban development?

What is the best approach for identifying urban development direction and conserving valuable areas around cities?
To answer these questions, first, the methods used to gather necessary and credible information will be introduced. The significant effects of regionalization on the correct prediction of urban development with a dynamic, spacial model that is flexible, nonlinear, adaptable, and expansively applicable will also be discussed. Then the different data processing methods will be discussed and the processed data will be analyzed. Urban development direction identification indexes will be obtained from the analyzed data.

DATA COLLECTION

Different methods have been presented for identifying dynamic urban development. Using optical sensors is one of the most commonly used methods. The similarity of building materials and the material found in that environment in urban areas can decrease the precision of this method. To solve this problem and precisely identify areas with changes caused by human interference, a combination of different data including the SLEUTH model, SAR data, SRTM DEM data, and optical data of Blasco et al, 2017 have been recommended. The following includes how each of these data sets was obtained.
SLEUTH model data are used to analyze the effects of different regionalization scenarios on urban development simulations. This process includes multiple sets of data that are modeled during different stages (Yin et al, 2018). The data required in this method is collected from a series of Landsat images (TM, ETM, and OLI) from various years along with all Shuttle Radar Topographic Mission (SRTM) images, Digital Elevation Model (DEM) at a 30m resolution (from the history available of Goggle Earth Database), and available topographic maps. Moreover, demographic data of the region over the studied years are collected from the statistics center, and general information on land cover and road network changes are obtained using the Global Positioning System (GPS) through field visits and field confirmation campaigns (Rimal et al., 2018), and Landsat (TM) mapping images obtained based on OLI are controlled to correct the possible errors and match them to topographic maps from various urban planning documents and comprehensive and detailed urban plans (Yin et al., 2018). Landsat (TM, ETM, and OLI) images are then confirmed for geometrical accuracy and processed in an ENVI environment, and the resulting multispectral are then geometrically and atmospherically corrected in pre-processing.
In this method, positional Root Mean Square Error (RMSE) is corrected is classified by a supervised-learning Support Vector Machine (SVM) after radiometric (images corrected with points fixed on the ground) and the ENVI model calibration (brightness calibration and geometrical and atmospheric correction) (Rimal et al., 2018). Each image is analyzed using the threshold determined by the classifier to obtain the portion of the urban map used from each Landsat (TM) and OLI image. The classification accuracy is then obtained based on the matrices' specific error and the Kappa index. Five series of data including urban expanse, slope, transportation, mountain shadow, and deleted layers are identified to implement the SLEUTH model, based on which an updated road network map measured with images from various years is eventually developed (Yin et al., 2018).
SAR data: In this method, the preliminary data are initially calibrated and then implemented using ESA specifications, determining the historical nucleus of the city which is eventually confirmed based on historical maps and further surveys. For this purpose, aerial images based on image pairs recorded over a maximum period of 140 days at an elevation of 120m are selected to increase the recognition accuracy and perform initial identification of cities and regions using interferometric coherence (the study can be performed under the influence of spatial, temporal, and thermal decomposition factors. Thus, a point in time when the minimum changes in the scene due to physical change and a short baseline for each geometrical symmetry are minimized is selected). This method is capable of portraying seasonal effects, sand storms, snow coverage, and other features specific to the city. The ground-referenced dataset is then obtained, and ground coding is carried out. Precise orbits are observed from spatial systems, and orbital information is recalculated to reduce the main recorded errors and their subsets (Blasco et al. 2017).
Values of optical data from Landsat metadata are implemented using USGS radiometric calibration and four backgrounds from various years are selected to minimize urbanization changes over a short while. Thus, four images from each year are used to create a mosaic and fill the gaps, providing the possibility to achieve 90% background coverage. All SAR images are eventually referenced to the modified geometry. Landsat data are also characterized using 30 ground control points obtained from SAR kernelization with multispectral and road data. It must be noted that ground control points must be distributed evenly across the studied region. The overlay is then resubmitted on the final satellite images by obtaining the final root mean square and using several first-order findings. Optical images are finally cropped to match with SAR data. Integrated data are obtained from the UTM project in the same image size and ground referencing system by the end of the data preparation stage and before commencing studies on the studied region (Blasco et al., 2017).

SRTM DEM data: These data are validated with other data according to ground-coded points from SAR data and recorded aerial image pairs to obtain integrated data on the studied land (Blasco et al., 2017). All collected data will eventually be checked with land cover changes over time and controlled using the Markov chain technique. The Markov chain technique is an efficient model to forecast the future based on the past, detecting the spatial area of change using Cellular Automata (CA). This model is used to predict the state of the region, the acceleration in urbanization, and the identification of transformation from one state to another over each period and has been implemented in many metropolises. Land Use/ Land Cover (LULC) classification which is typically based on remote sensing images is first considered. This trend is among topical fields of research in terms of global environmental change. Changes in land cover, environmental impacts, and rapid response of human activities to nature have significant environmental consequences. Anthropogenic factors (impacts humans leave on nature) play a crucial role in land use in each region, encompassing population growth, construction, and socioeconomic phenomena. Furthermore, the impacts of urban expansion and environmental ecology generally risk sustainable urban development in developing cities contradicting plans if not aligned with local policies. Overall, it would be vital to predict future urban growth accurately and manage it based on reliable statistics and a deep understanding of urbanization trends and patterns. Accurate, up-to-date, and consistent information on the urbanization trend is of vital significance to developing a sound understanding of urban development orientation and compiling appropriate policies for sustainable urban development accordingly. Maps demonstrating land use change over time provide necessary information for land use planning that help understand the dynamics of land cover transformation and forecast environmental and economic effects in the future. It must be noted that remote sensing and GIS are appropriate tools to oversee land cover, plan cities, and explore spatial changes in land cover on a global scale (Rimal et al., 2018) (Figure 1).

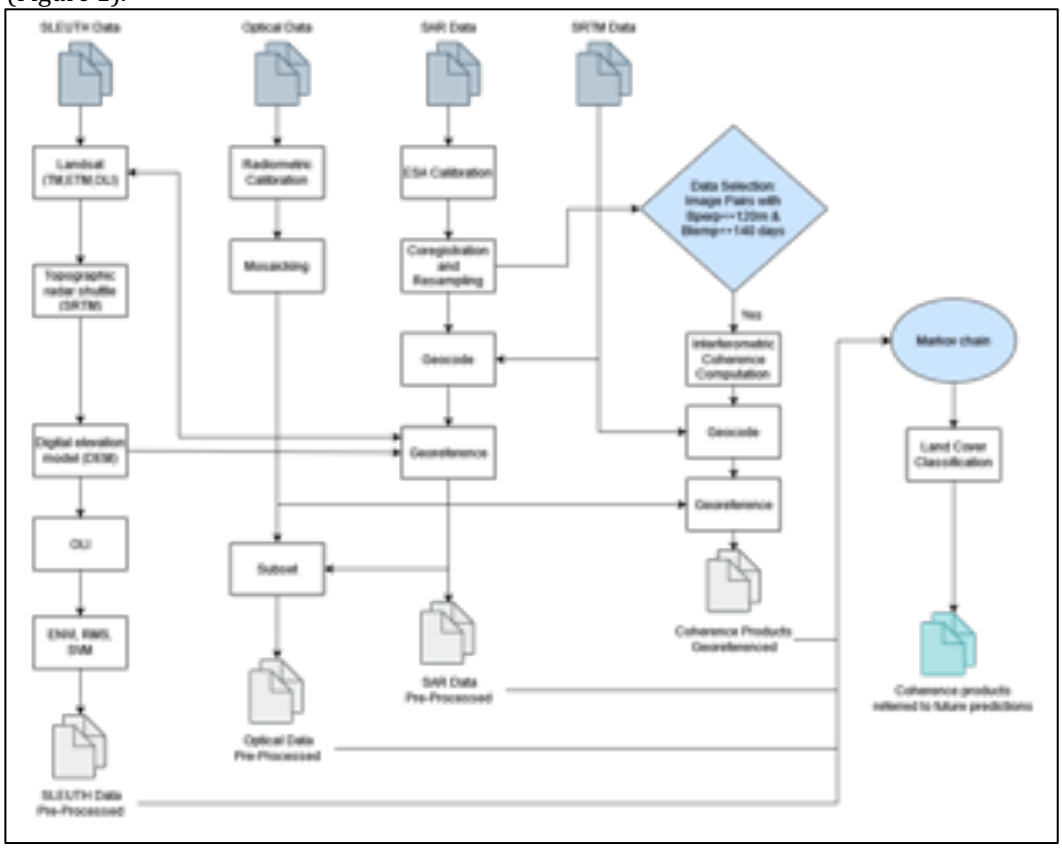


Figure 1: data collection steps to identify the direction of urban development

DATA PROCESSING

Data processing is performed following the data collection stage. Future urban expansion and land cover can be predicted based on the results of the SLEUTH model. The acquired information changes according to the correction of internal parameters or the intervention of an exclusive layer based on historical data. SLEUTH data are thus used in urban planning activities since they can support deleted layers. Another important advantage of this model is that data from remote sensing GIS can be integrated into it, based on which five different zoning detection scenarios are designed (Yin et al., 2018):

The first scenario is void of zoning and is used as a criterion to examine the potential impacts of land use and specific development policies on urban growth simulation.
The second scenario is a land-use-based zoning scenario designed to address the probable effects. Although land use policies are prioritized considering the type of land use, this scenario does not account for development policies across various regions with various spatial locations across a country and is presented solely based on land use.
The third scenario is designed based on the evaluation of urban development and accounts for the urban development potential in terms of land use and urban development policies concerned with regional distinctions and the conservation of the environment and natural resources. This scenario is also helpful in accessing deleted layers.
The fourth scenario consists of zoning based on political division. Each city is thus divided into districts based on various levels (national, provincial, urban, regional, or exclusive).
The final scenario is concerned with zoning based on urban development planning as an extension of the urban expansion evaluation scenario (Scenario No. 3) and reflects the probable impacts of development policies under various circumstances.
Integration of the scenarios mentioned above can create a coherent and accurate planning program. Following the introduction of the five scenarios concerned with the recognition of the city, the five influential indices in the process of identifying urban development direction include:
The positioning of various elements adjacent to rivers counts as a confining factor.
The slope in the region would prevent it from being developed as a region appropriate for urban planning if it exceeds 25%.
Land features (wrinkles) that would render the region inappropriate for development if their average height exceeds 40m.
Vegetation such as agricultural areas and forests measured by the NDVI index. According to this index, regions with NDVI over 0.45 would be inappropriate for development, whereas 50% of the areas with NDVI under 0.45 can be developed.
The final index is the distance between the city center to the outskirts, an appropriate amount of which would be one that can be traveled over 10-30min. Distances of 30-60min are acceptable as well.
The primary direction of urban development is obtained based on the processing mentioned above. The urban model is then calibrated for an accurate regeneration of the historical urban development to provide the possibility of simulating and predicting urban development in the future. Successful model simulation is significantly dependent on the calibration process. Each calibration process consists of several Monte Carlo tests using available data from previous years as the primary layers (Tin et al., 2018). Classified maps are validated through field observations. High-resolution images obtained from Digital Globe and available on Google Earth are also evaluated through the investigation of various sets from different periods. SAR and optical data are also integrated and validated with the Kappa index once more as final classification maps are validated using the overall success and integration ratio. After the five LULC maps are obtained for various periods, the pixels that have remained stable and those that have been identified are labeled with unreal changes in different years and are considered revisable classification pixels. The following are assumed in this classification: 1. if an urban pixel is observed once, said urban pixel will be present in the following periods as well, 2. Watersheds cannot change into urban or desert areas, and 3. only farmlands can transform into urban or UAD (Urban Archeological Database or Historic valuable regions) areas and will not change into deserts or watersheds. However, the water level mainly corresponds to the river in some areas.
Implementing the aforementioned, a Kappa index of over 0.82 was obtained based on the reference (Blasco et al., 2017), indicating excellent accuracy. The results of the mentioned procedure were a prediction of urban development patterns capable of forecasting the internal and external development direction of the city as well as its changes over several years into the future (Yin et al., 2018).
Spatial analysis of urban development is of crucial significance since it provides accurate information on the spatial location, features, and consequences of urban expansion used to compile urban development plans, develop and modify urban morphology theories, and define the boundaries between urban regions and the environment in some environmental models.
Meanwhile, urban development models tend to predict events and their consequences in a specific space and time. On the one hand, urban growth is inherently accompanied by changes in land cover and leaves abrupt impacts on the ecology. The use of the Markov chain is an efficient way of predicting the variables studied by several scholars such as Rimal et al. (2018). In this technique, the Markov chain –an appropriate technique used to model land cover changes in places where understanding and defining landscape relations is difficult- is used to predict urban development. The process of implementing the Markov chain generally consists of preparing land cover maps on fixed intervals, calculating transfer

matrices based on land cover maps, and selecting potential maps using transport factors. Kappa indices and simulation of land cover maps for the years to come are also used to evaluate the performance of the model. Rimal et al. (2018) used a Radial Basis Function (RBF) with the proven capability of classifying remote sensing images over other networks (e.g. linear, polynomial, and sigmoid networks). After extensive field surveys, they introduced six main classes of land use including constructed urban areas, cultivated land, vegetation (scattered and dense forests, shrubs, and grass), sandy areas, water cover, and open fields. To identify urban development direction, FRAGSTATS software was used to obtain the landscape and Principal Component Analysis (PCA) was performed for landscape evaluation. After performing cluster analysis, this software is used to detect the changes in landscape patterns in the four main geographical directions (north, south, east, and west). Through this process, urban nuclei are identified, each region is studied based on classified satellite images and field visits, and urban development direction is observed through the coverage created using ArcGIS software. Results must determine the direction of urban development (Rimal et al., 2018).
Results suggested that fast urban development was associated with a sharp decline in agricultural lands and vegetation. Thus, urban development threats food security and the health of the community on top of reducing agricultural lands and leaves adverse impacts on the integrity of the ecosystem. On the other hand, urban development accompanies increased population and personal and public vehicles, which are expected to increase environmental pollutants and pose environmental threats to the residents through the destruction of natural purifiers (soil and plants). Therefore, it would be prominent to implement closely inspected urban plans to preserve valuable sites seeking to maintain the balance between urban development and the conservation of natural and historical sites (Rimal et al., 2018) (Figure 2).

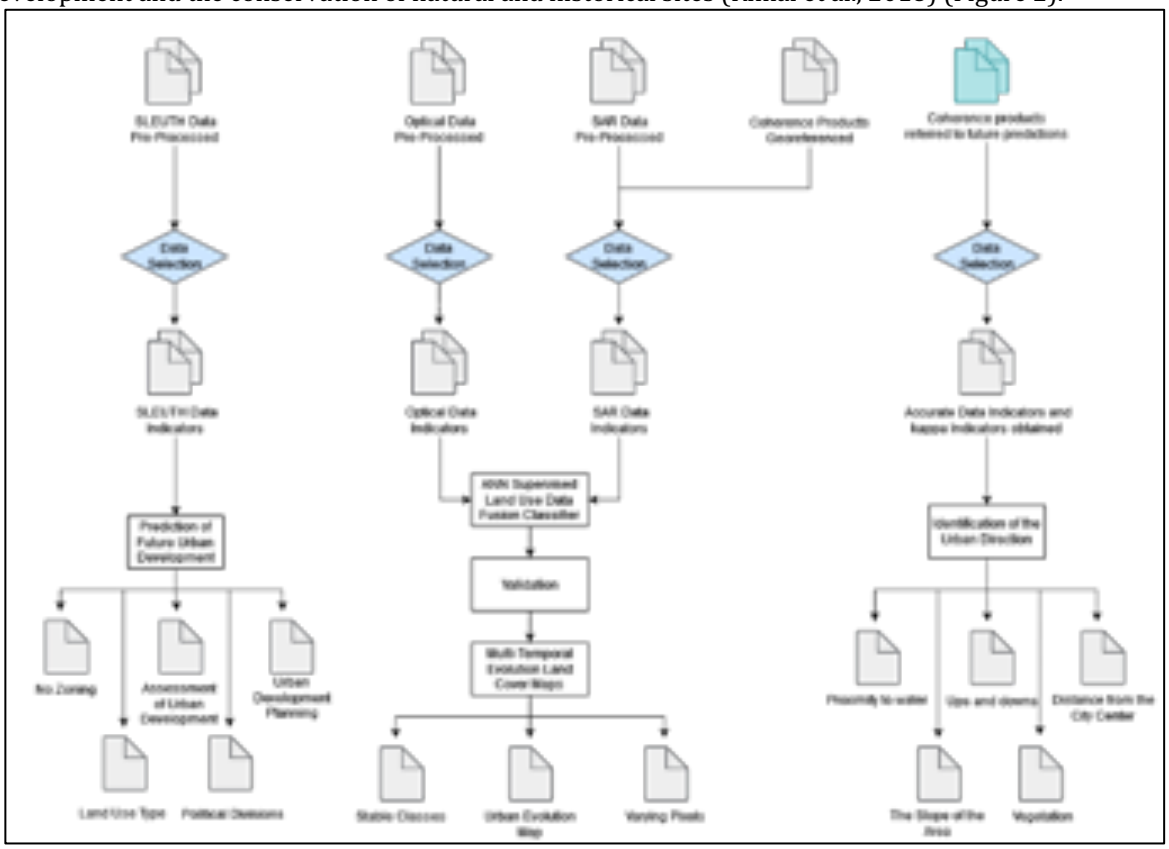


Figure 2: stages of processing the acquired data to identify the direction of urban development

CASE STUDY (QOM, IRAN)

Situated in the south of the capital of Iran, Tehran, Qom province is known as its capital city of Qom. The province has an area of 11,474km2 and a mean elevation of 1,946m with maximum and minimum heights of 3,154 and 774m above sea level (Atlas map and spatial information of Qom province, 2018:1). Qom province has a mild climate with long hours of direct sunlight. The province experiences harshly warm summers and dry, cold winters due to land features such as Hoz-e Soltan and Namak Desert, extreme evaporation across the desert, lack of high altitudes in its central regions, and eastern and western winds (Figure 3) (Moarrefi, 2021:1).

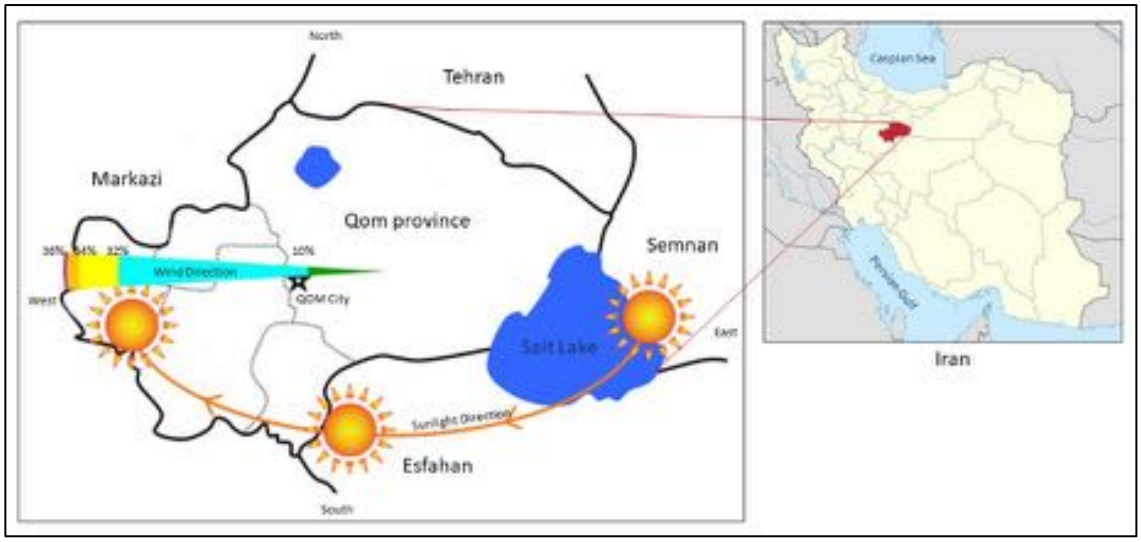


Figure 3: Qom province landmarks and introduction of climatic direction in political division and cities around the province (Qom province, 2021, edited by author)

Data were first collected from Landsat satellite images and then modified based on the studies. Images acquired from ENVI software and Landsat 7 satellite were investigated using a Neural Network classifier and Support Vector Machine (SVM), which led to many errors classified into 11 classes based on the Ministry of Jihad and Agriculture's standards. The standard land use layer of Qom province (GIS) was then used to analyze the information (Figure 4) (Rohani et al., 2021: 7).

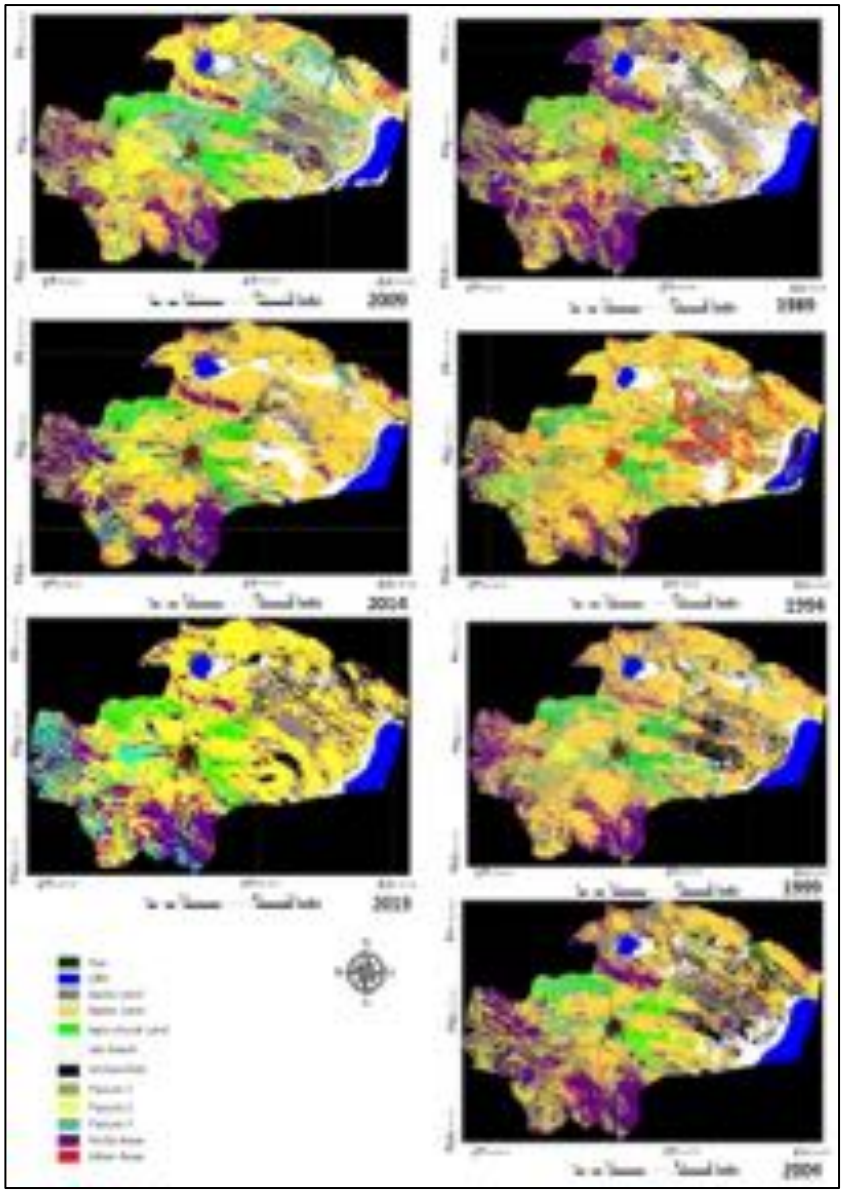


Figure 4: results of Landsat satellite image classification for studied intervals (Rohani et al., 2021: 1)

Images were then studied over the five years between 1989 and 2019 through the identification of meteorological and climatic changes. Images from various Landsat satellite sensors were processed and classified into 11 classes barren lands, sandy lands, salt marsh, trees, rocks and stones, residential areas, agricultural lands, and three types of pastures (Rohani et al., 2021:1).
Acquired data suggest the accelerating development of Qom province and irreparable damage to agricultural and suburban lands (Esmaili and Shajaei, 2019:18). Further studies of Landsat images indicate that the classes of sandy lands, pasture type 1, salt marsh, trees, and lakes underwent negative growth in Qom over 1989-1994 so that 34% of various pasture classes transformed into barren land. Between 1994 and 1999, three classes underwent positive growth whereas other classes had negative growth, over which most classes changed into the barren land, 12% of which transformed into sandy lands. Proper separation was not achieved between some classes due to the spectral similarities between them. The changes over 1999-2004 suggest negative changes in the class of trees and their transformation into agricultural lands and pastures due to the spectral behavior of the vegetation, as well as a 4% change in lakes into stone and salt marshes. Moreover, over 50% of the pastures transformed into barren lands. Negative growth in urban regions was observed between 2004 and 2009, which indicated a spectral behavior similar to salt lands through which the lake inside the city turned into a salt marsh. The area underwent a 30% decline in the three pasture types over 2009-2014, through which pasture and sandy and rocky lands turned into barren land. Significant growth was observed in the

classes of urban areas, water bodies, agricultural lands, and pasture types 1 and 3 over 2014-2019, suggesting the incidence of a drought in the city (Rohani et al., 2021:2).
Excel and GIS were used to enter climatic and meteorological data of selected stations into ArcGIS software. The correlation between height and heating and cooling needs indices was then examined in the software environment, and the DEM of the studied area was used to implement and map the correlations between the indices (Shaemi et al., 2019:4). Land surface temperature maps were also prepared by processing Sentinel3 satellite images which indicated that the highest temperature was observed in urban regions lacking vegetation (Figure 5) (remote sensing, 2019).
The use of the Markov chain as a forecasting technique is of vital importance in the urban development process. In this process, the 2009 and 2016 land use maps were introduced as the old and new maps, respectively, and the transfer matrix was calculated for the next 10 years in Qom accordingly. The CA function of Markov was then used to forecast the 2026 land use map in the software environment considering the 2016 land use map as the base map and the transfer area file resulting from the previous stage of implementation. Eventually, the changes across the province were revealed to be the greatest in 2009 and the lowest in 2016 considering the Kappa index and overall validity (Figure 6) (Esmaili & Ashjaei, 2019:2).

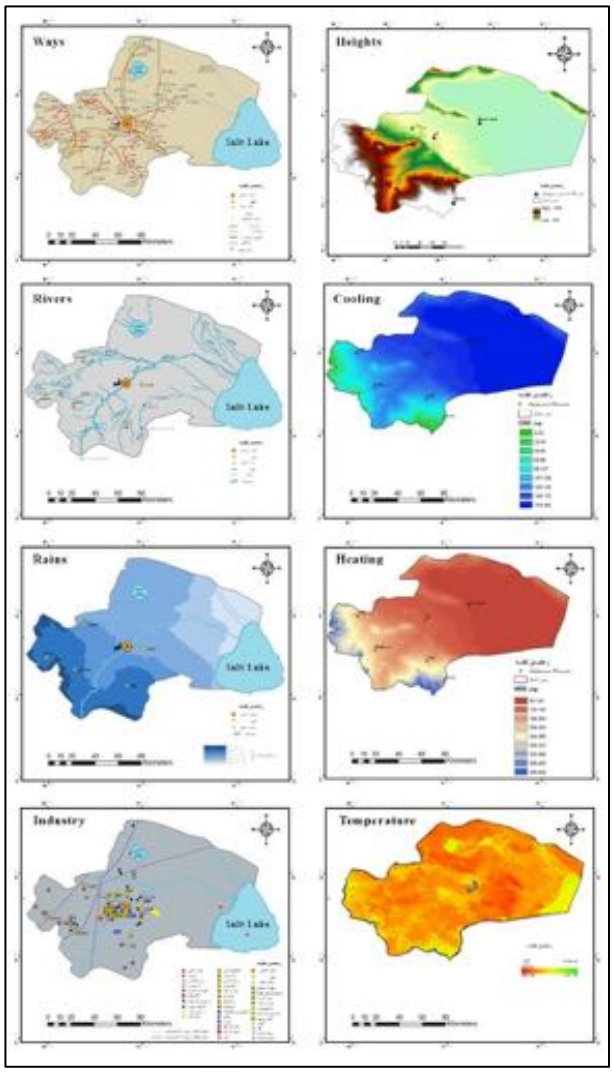


Figure 5: Distribution of heights, cooling, heating, temperature, precipitation, rivers, roads, and industries in Qom province (Shaemi et al., 2019; remote sensing, 2019; Qom province, 2021)

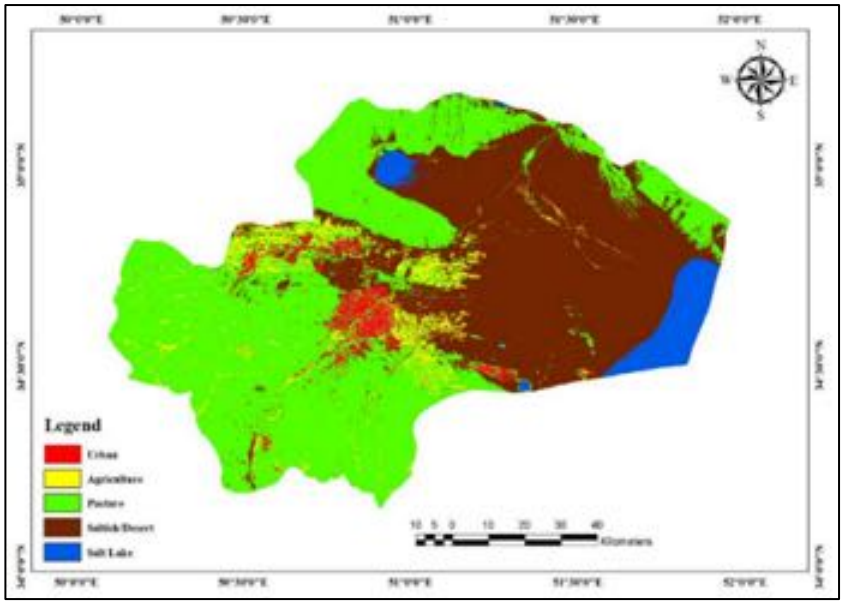


Figure 6: projected 2026 land use in Qom province using the Markov chain (Esmaili & Ashjaei, 2019:17)

The important point here is to consider the area of natural and historical heritages when planning for urban development in the province. A study of the previous plans developed for Qom province indicates negligence toward the existing heritages across the province, many of which have been exposed to the risk of destruction and damage. Thus, complementary plans need to be developed using remote sensing images, surveys, and studies of historical documents and books to perform a close investigation and identification of the natural and historical heritages, prioritize them in the planning procedure, and preserve them for future generations.

Identification of the regions is of great significance. Through this procedure, GIs is used to analyze the overlap between topography and heritage sites and culture. Cultural-historical heritage sites are mainly distributed along the main arteries of regional transportation. Identification of features such as the edges of areas covered in trees, mountains, and lakes and three-dimensional images obtained from aerial and GIS images can help analyze the acquired data and calculate height benchmarks accurately. However, the background of historical cities and regions with geographical features such as rivers and mountains may be misunderstood in terms of preservation and management. On the other hand, historical sites are generally situated in low-altitude areas and can thus be verified through three-dimensional images. Results may be highly erroneous if only GIS images are used, so it would be recommendable to employ several planning control indices.

To this end, historical and natural heritages in Qom province were mapped as demonstrated in the following. The identification of the regions may not be thoroughly accurate given time and data limitations (Figure 7).

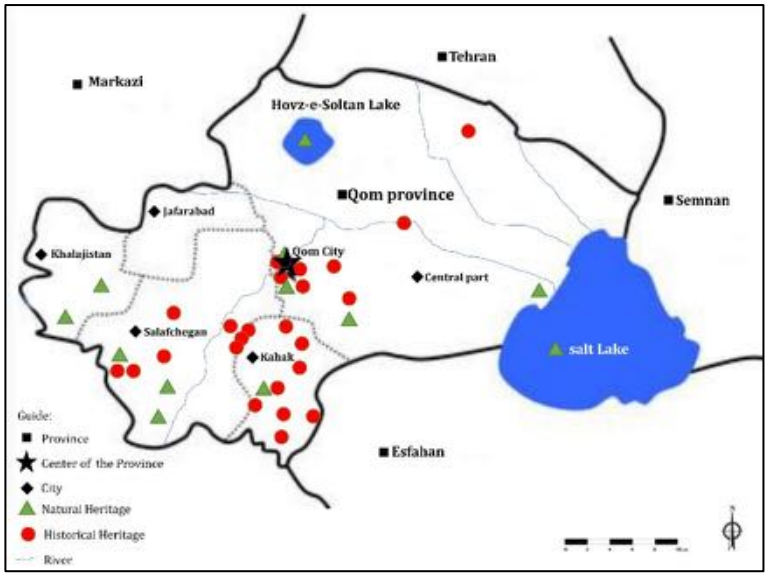


Figure 7: Location of historical and natural heritages across the current area of Qom province

ANALYSIS

As mentioned, we found that the patterns used to predict urban expansion are compiled using urban development models and help develop new rules in the identification of development direction by integrating planning policies into zoning while considering the urban development model. Further studies are required to examine the influences of urban development policies to achieve a desirable level of accuracy by enhancing the measurement capabilities of techniques used to weigh various zoning scenarios since spatial differences are not applied in this method and the resulting urban development simulation is only moderately accurate. It must be noted that the method adopted in the present study cannot be used on micro scales (Yin et al., 2018). Although it would be possible to determine urban development direction through remote sensing techniques (integration of SAR, SRTM DEM, and optic data), observing the changes in natural resources alone would not offer adequate information and would only optically images with a moderate resolution that help identify unknown regions. Reviewing image pairs would also increase the accuracy of collected information when calculating interferometric coherence. In the identification of Historic valuable regions or Urban Archeological Database (UAD) areas, the structure of future regions could be identified in the primary stage by synchronizing sensors and defining new areas –such as UADs. Moreover, cultural-historical sites that have been affected by the urban development must be zoned again for conservation purposes (Blasco et al., 2017). The study of land cover patterns –specifically the dynamics of urban expansion- using Landsat images from various periods could help complete performed activities and increase the accuracy of prediction. The accuracy of land cover maps can be increased to 85-93% using the SVM algorithm in this method (Rimal et al., 2018). In this regard, primary and comprehensive information such as land use change maps provide planners with necessary information used in land use planning that can help understand the dynamics of land cover transformation and predict future environmental and economic impacts. Urban planning and exploration of spatial changes in land cover and land use changes are also helpful tools in monitoring land cover. However, planners have failed to adopt heritages and values into urban planning and urban development in many cases over the recent decade. Separating conservationists and urban planners' activities has put natural and historical heritages in harm's way in many regions.

Although the plan to preserve “cultural and historical cities” requires the cooperation of supreme planning institutions and a well-designed draft, the resulting plan must be revised several times by the respective municipality, local experts, city council, and urban planning committees. Selected experts in charge of the “cultural and historical cities” department must eventually confirm the plan in the respective council, and a summary of the document must be published before its public announcement so that the public and stakeholders can voice their recommendations in this regard.

It must be noted that successful planning will only be achieved as long as it is integrated and considers urban conservation principles based on adequate information and seeks to protect values. Urban landscapes cannot be designed with no regard for the relationship between the city and its valuable sites. Turning to proper preservation plans indicating instructions to preserve values, comprehensive urban plans, landscape, and urban space restoration plans, issuing permits for unplanned and untimely

constructions has interfered with the process of urban preservation. Thus, construction in city centers must be controlled and urban expansion should be redirected away from valuable sites around cities. Moreover, it would be better to use removable construction materials on micro scales in a region as long as the region is still being studied and planned for so that the changes made to the urban environment can be retracted while responding to the needs of the citizens (Fu & Jin, 2020).

CONCLUSION

The present study reviewed the presented method to introduce an integrated and practical technique to identify the direction of urban development. In this regard, the first step was to perform an accurate identification of the region by collecting regional zoning data, SAR, optical, and SRTM DEM data, investigating land cover changes from the past to the present, and predicting the future accordingly using the Markov chain. Instruction on how to implement the mentioned methods and present a vision based on theoretical foundations and historical studies were then presented, based on which a city may develop a successful, integrated preservation plan. Historical documents were first studied based on the integrated urban preservation planning method, and three features of ongoing changes, urban region size, road development, and the number of large-scale construction projects which indicated the speed of urban development were studied through urban morphology analysis (mostly concentrated on critical points and influential factors). Oblique three-dimensional image technology and GIS can be highly influential in this method seeking to preserve landscapes and the contexts of historical cities. These tools are also helpful in recording the urban space on a large scale, discovering topographic relationships between the past and the present, providing scientific support in the analysis of heritage values, and helping develop a mentality toward the analysis of visual simulations that makes for an accurate and easy predication of the decision-making process in planning and development. The use of oblique three-dimensional images and GIS will play a more significant role in urban development and historical city preservation in the future as the R3 technology is set to improve. Still, technologies are helpful tools to enhance efficiency but cannot replace humans when it comes to proper evaluation, and efforts to seek optimal solutions continue in this regard.

The significance of the present study is that it presents an accurate strategy to identify the regions by integrating several different approaches through which the errors of each technique are overcome and the best result for planning future regions based on citizen needs and heritage preservation is achieved. Turning to the case study of the present study, more extensive and closer studies need to be performed on the region since the accelerating growth of the cities in the province and the sharp decline in the area of pastures and agricultural lands are threatening the historical and natural heritages of the regions. Many documents have reported planning to have been unsuccessful in this region, and closer attention must be paid to urban and development planning in the studied province while holding historical and natural heritages a priority.

ACKNOWLEDGMENTS

I would like to express my gratitude and appreciation for Dr. Zahra Kouzehgari and Dr. Ali Zamanifard whose guidance, support, and encouragement have been invaluable throughout this study. I also wish to thank my parents, who have been a great source of support

REFERENCES

Atlas of maps and spatial information of Qom province., 2018. *Publications of the country's mapping organization*, id ATS97TC01PV0023D. (in Persian).
https://www.ncc.gov.ir/images/docs/files/000001/nf00001838-1.pdf
(Accessed 30/7/2021).

Blasco, J. M. D., Verstraeten, G., & Hanssen, R.F., 2017. Detecting modem desert to urban transitions from space in the surrounding of the Giza World Heritage site and Greater Cairo. *Journal of Cultural Heritage*, 23, 71-78.

Charter,w ., 1987. Charter for the Conservation of Historic Towns and Urban Areas (*The Washington Charter)*
https://www.icomos.org/images/DOCUMENTS/Charters/towns_e.pdf

Fu, S., & Jin, P., 2020. Formation of the modern scenic city of Hangzhou: towards conservation integrated urban planning, 1950s–1990s. *Built Heritage*, *4*(1), 1-14.

Hasanzadeh, M & Soultanzadeh, H., 2017. Development of a conceptual model for realizing the sustainability of historical contexts with a strategic approach to regeneration planning. *Journal of bagh nazar,* 14(54), 57-70. (in Persian)

Ismaili, A. Ashjai, H., 2019. Modeling land use changes through Markov chain and using geographic information systems and remote sensing (case study: Qom province). *Journal of Geography and urban planning.* 9(31). 153-172. (in Persian).
Moarefii, A,. 2021. Climatic, environmental, biological and geographical features of Qom. *sites of Environmental science analysts.* (in Persian).
4 منبع داده رایگان DEM مکانی علوم تحلیلگران - (مدلهای رقومی ارتفاع) (coactm.ir)
(Accessed 24/8/2021).
Pendlebury, J., 2005. The modern historic city: Evolving ideas in mid-20th-century Britain. *Journal of Urban Design*, *10*(2), 253-273.
Qom province., 2021. *Published on Wikipedia's free encyclopedia site.*
https://fa.wikipedia.org/wiki/%D8%A7%D8%B3%D8%AA%D8%A7%D9%86_%D9%82%D9%85.
(Accessed 30/7/2021).
Rimal, B., Zhang, L., Keshtkar, H., Haack, B. N., Rijal, S., & Zhang, P., 2018. Land use/land cover dynamics and modeling of urban land expansion by the integration of cellular automata and markov chain. *ISPRS International Journal of Geo-Information*, *7*(4), 154.
Rohani, N. Moradifaraj, A. Mojaradii, B. Rajaii, T. Jabbari, E., 2021. Investigation of land use changes in Qom province along with climatic parameters using satellite remote sensing technology. *Journal of Remote sensing and geographic information system in natural resources,* 12(4), 28-46. (in Persian).
Remote Sensing., 2019. Satellite monitoring of Earth's surface temperature in Tehran, Alborz and Qom provinces, *published on the official website of the Ministry of Communications and Information Technology of Iran Space Organization*.
https://rs.isa.ir/fa/news/51835-%D%85%9D%8AD%D%8A%7D%8B%3D%8A%8D87%9-%D%8A%8D%8B%1D%8B%1D%8B%3DB8%C-%D%8AF%D%85%9D%8A%7DB8%C-%D%8B%3D%8B%7D%8AD-%D%8B%2D%85%9DB8%C%D86%9-%D%8AF%D%8B1-%D%8A%7D%8B%3D%8AA%D%8A%7D86%9-%D%87%9D%8A%7DB8%C-%D%8AA%D%87%9D%8B%1D%8A%7D86%9-%D%8A%7D%84%9D%8A%8D%8B%1D%8B2-%D%82%9D85%9.html
(Accessed 13/10/2022).
Shaemi, A. Nikandish, N. Hoseini, M., 2019. Optimum location of greenhouses for growing high consumption vegetables in Qom province (with emphasis on optimal energy consumption). *Journal of Climatology researches.* 10(37). 101-110. (in Persian).
Unesco., 1976. Recommendation concerning the Safeguarding and Contemporary Role of Historic Areas1976
http://portal.unesco.org/en/ev.php-URL_ID=13133&URL_DO=DO_TOPIC&URL_SECTION=201.html
Unesco., 2011. Recommendation on the Historic Urban Landscape, including a glossary of definitions
http://portal.unesco.org/en/ev.php-URL_ID=48857&URL_DO=DO_TOPIC&URL_SECTION=201.html
Wang, T., & Zhou, L., 2019. APPLICATION OF OBLIQUE PHOTOGRAPHY AND GIS TECHNOLOGIES IN THE INTEGRATED CONSERVATION AND DEVELOPMENT OF HISTORIC CITIES IN CHINA: PRACTICES IN SHIGATSE, TIBET AND QUANZHOU (ZAYTON), FUJIAN. *International Archives of the Photogrammetry, Remote Sensing & Spatial Information Sciences*.
Yin, H., Kong, F., Yang, X., James, P., & Dronova, I., 2018. Exploring zoning scenario impacts upon urban growth simulations using a dynamic spatial model. Cities, 81, 214-229.

THE EFFECT OF TALL BUILDINGS ON URBAN CONTEXT: CASE STUDIES OF SHANGHAI AND DUBAI

GÖKÇE NİHAN DEMİREL

Gökçe Nihan Demirel, Research Assistant, Middle East Technical University, Department of Architecture

ABSTRACT

Tall buildings are emerged in 19th century and become an important factor that affects the urban context of cities all around the world. First examples of the tall buildings were designed as a result of population growth and increasing land values in developed cities. Today, the population and economics of the cities are still valid motives for designing tall buildings and number of the tall buildings are increasing all around the world. The correlation between tall buildings and population or economy of the cities is important to understand the future of the developing cities and should be studied as the number of tall buildings constantly increasing. Because of their scale and inherent qualities, tall buildings have a critical impact on urban context. The increasing population and growth in economics triggers the construction of the tall buildings and the number of tall buildings in a city also affects the population and economics of the cities. In this study, the relation between population and economy of the cities and the number of tall buildings constructed over the years is investigated. Two cities, Shanghai and Dubai, is selected since they inherent many tall buildings including the tallest completed buildings of the world; Burj Khalifa and Shanghai Tower. The study focused on 40 years' period, the years between 1980 and 2020. For the given years, data of population, population growth, gross domestic product (GDP) and number of completed tall buildings are obtained. The data is compared and discussed to demonstrate the relation between these parameters. Results show that, there is a direct relation between the parameters and similar cases are observed for two studied cities.

Keywords: Tall buildings, urban context, population, economics

INTRODUCTION

Tall buildings have been emerged in United States in late 19th century. Two major motivations that lead architects to design tall buildings were the population growth and the increasing land values (Harbert, 2002). In cities like Chicago, the population density was increasing rapidly. To be able to cope with this increasing density, architects started to design taller buildings where they can produce more interior space per building footprint area. Producing more interior space was also beneficial financially because the land values were getting higher and they need more rentable area.

Today number of the tall buildings are increasing all around the world. These two factors, population growth and urban economics, are still valid concerns for tall building design. Al-Kodmany (2018) suggested that, one of the major motivations for designing tall buildings is exponential increase of the urban population. Two decades ago, one third of the world population was living in the urban. Currently, almost half of the world population is living in the urban areas. It is expected that, in 2030s urban population will cover about 60% of the world population. In 2050s, this ratio may reach to 80% where world population is expected to reach 9 billion.

As population and economy of the cities affect the number of tall buildings, the number of tall buildings also affect the population and economy of the cities. Jedwab et. al. (2021) noted that population of a city is a product of land area, built space per unit land and occupant per unit interior space. In cities with growing economies, the total area of the built environment expends. Besides, the height limit of the buildings, in other words the number of tall buildings, increases. Thus, total interior space increases. Although occupants use relatively more interior space in economically growing cities, the raise in the total interior space refers to an increment in population of the city. They also argued that, to be able to demonstrate the relation between total interior space of the city and the population of the city, both residential and commercial spaces should be examined. Taking only the accommodation buildings into account may be misleading. Office buildings and any type of commercial spaces should also be investigated (Jedwab et. al., 2021).

Tall buildings also affect urban agglomerations. Urban agglomeration can be defined as an extended city or town area comprising the built-up area of a central place and any suburbs linked by continuous urban area. Liu et. al. (2020) pointed out that, agglomeration effect is an important concept that affects a city's population and economy. Tall buildings have a major impact on defining agglomerations of a city. Accumulating tall buildings in a specific area, which is the case for most of the cities, can create a center where population density and workforce is higher. Jedwab et. al. (2021) investigated national per capita GDP and average tall building height of over a thousand urban agglomerations and they observed a direct relation between these parameters.

As the number of the tall buildings and the population in cities are increasing rapidly, it is important to understand the effect of the tall buildings on urban content. In this study, the relation between number of tall buildings and population and economy of the cities is investigated in both ways. Two cities, Shanghai and Dubai are selected as case studies. Results show how tall buildings affect and be affected by urban metrics.

METHODOLOGY

Within the content of this study, two cities are investigated which are Shanghai and Dubai. These cities are selected because they inherent the tallest completed buildings of the world, Shanghai Tower and Burj Khalifa, and also many other tall buildings.

Shanghai is one of the most populated cities of People's Republic of China. The city is an important business center of the distinct with its port. Including the Shanghai Tower, the second highest building of the world, there are many tall buildings in Shanghai. Figure 1 shows and image of a central distinct of Shanghai were tall buildings are accumulated.

Figure 1. Shanghai city (retrieved from: https://skift.com/)

Dubai is the most populated city of United Arab Emirates. The highest completed building of the world, Burj Khalifa, is located in Dubai. It is a city with large scale projects and investments. There are many tall buildings in the city which are the dominant factor of the city silhouette. Figure 2 shows the urban context of Dubai.

Figure 2. Dubai (retrieved from: https://edition.cnn.com/)

For selected two cities, the number of tall buildings that are constructed by each year and cumulative number of tall buildings are obtained for the years between 1980 and 2020. Tall buildings are determined according to the standards of Council of Tall Buildings and Urban Habitats (CTBUH). To discuss the population growth of the cities total population and population growth values are obtained for each city for the same time period. To investigate the economy of the cities gross domestic product (GDP) values (in USD) are obtained. Two cities are studied separately because they belong to different countries and continent and not comparable in scale.

RESULTS AND DISCUSSION

Shanghai

First tall buildings of Shanghai are completed in years 1988 and 1990. From 1995 to 2020, the number of the tall buildings are increased (CTBUH). Figure 3 shows the number of tall buildings completed in each year in Shanghai. Figure 4 shows the cumulative number of tall buildings in Shanghai. By the year 2020, the total number of tall buildings is 166.

Figure 3. Number of the tall buildings completed in Shanghai

Figure 4. Cumulative number of tall buildings in Shanghai

Population growth of the city and number of the tall buildings that are constructed each year is compared. Figure 5 shows the data of these two parameters. Between the years 1990 and 2022, there is an increase in population growth. The year 1990 is also the year that first tall buildings in Shanghai were constructed. After 2002, the number of the tall buildings are increased, yet no other correlation between these two parameters are observed.

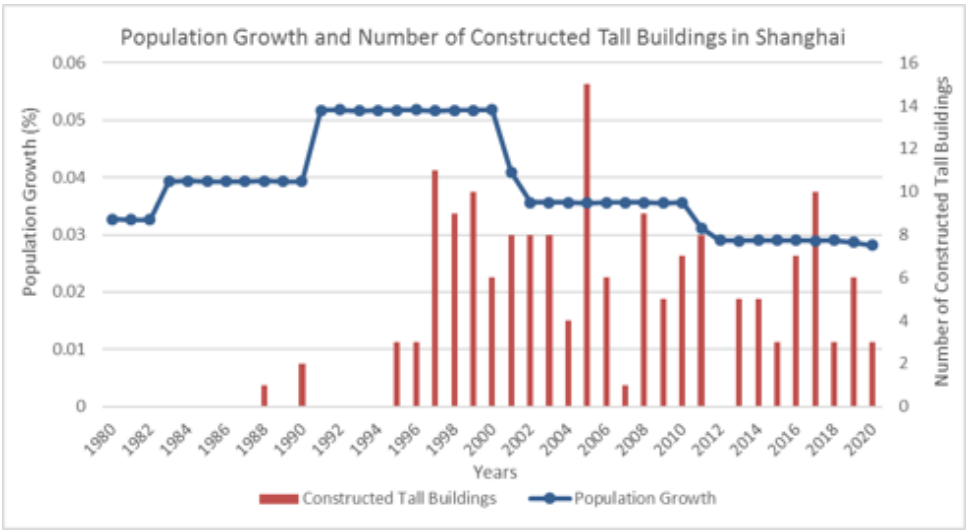


Figure 5. Population growth and number of the completed tall buildings in Shanghai

GDP values and number of tall buildings are also compared in figure 6. It is seen that both values are started to increase in 1996. Although the rate of increase is not the same for two values, there is a correlation between two trend lines.

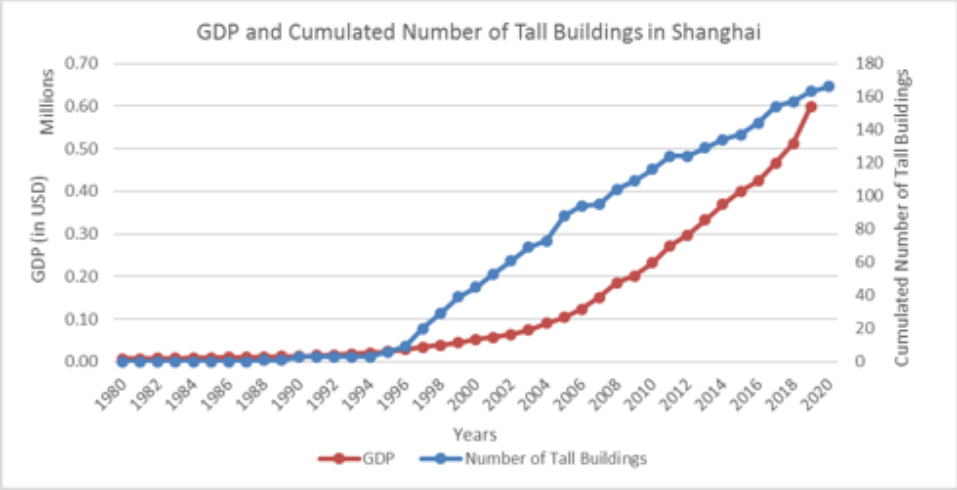


Figure 6. GDP values and cumulated number of tall buildings in Shanghai

Dubai

The first tall building in Dubai is completed in 1992. By the end of 2020, the total number of tall buildings in the city reached to 233 (CTBUH). Figure 7 shows the number of tall buildings completed in each year in Dubai. Figure 8 shows the cumulative number of tall buildings in Dubai.

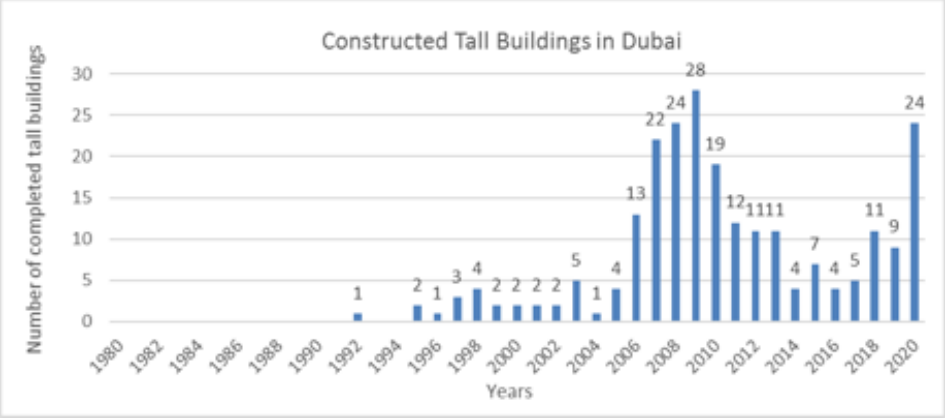


Figure 7. Number of the tall buildings completed in Dubai

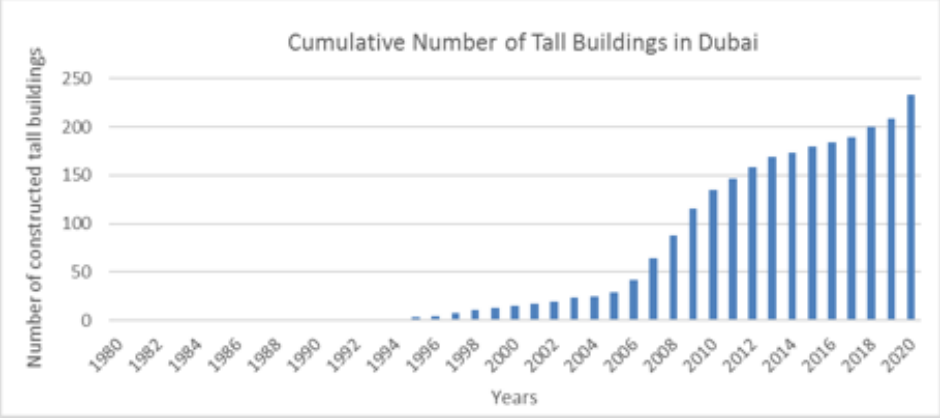


Figure 8. Cumulative number of tall buildings in Dubai

Population growth and the number of completed tall buildings are compared for Dubai. Figure 9 shows the result. It is seen that between the years 2006 and 2011 there is an increase in number of tall buildings and this increase also can be observed in population growth.

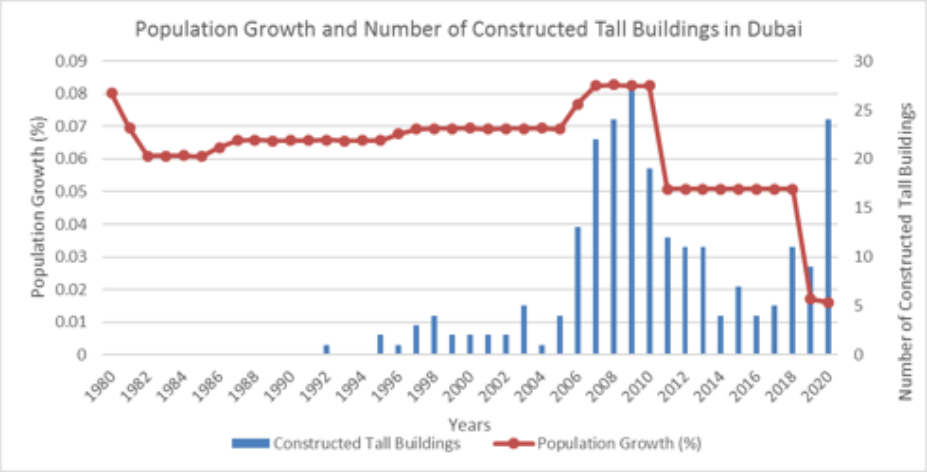


Figure 9. Population growth and number of the completed tall buildings in Dubai

GDP values and the cumulative number of tall buildings are compared figure10. For the whole time period that is investigated a direct correlation is observed between two values.

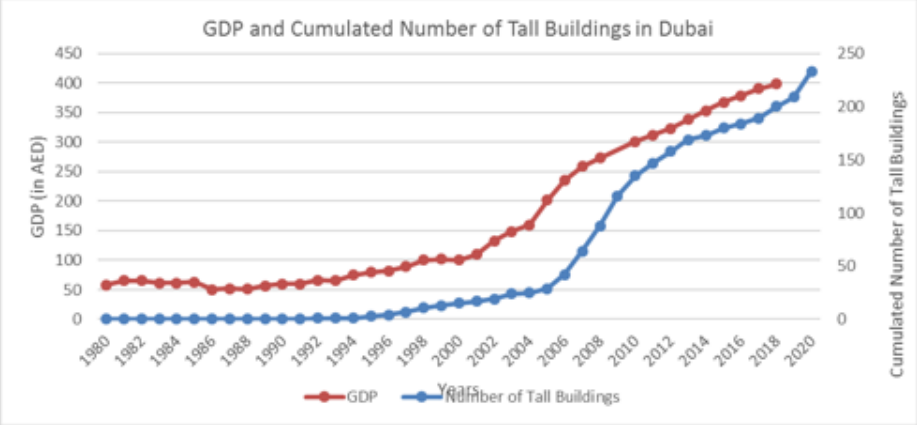


Figure 10. GDP values and cumulated number of tall buildings in Dubai

CONCLUSION

Tall buildings are a part of developed cities and have a bold effect on urban content. In this study, their impact on population and economy of the cities is investigated via case studies of Shanghai and Dubai. Results show correlations between the number of tall buildings, population growth and GDP values of the cities. Future studies may investigate other cities or study the cities in detail by focusing on urban agglomeration.

REFERENCES

Al-Kodmany, K. (2018). The sustainability of tall building developments: A conceptual framework. *Buildings, 8(1)*, 7.

CTBUH. Council of Tall Buildings and Urban Habitat. www.skyscrapercenter.com

Harbert, L. (2002). Home insurance building-the first skyscraper. *Journal of American Society of Civil Engineers ASCE, 43*(2), 1–2.

https://worldpopulationreview.com/

Jedwab, R., Loungani, P., & Yezer, A. (2021). Comparing cities in developed and developing countries: Population, land area, building height and crowding. *Regional Science and Urban Economics, 86*, 103609.

Liu, C. H., Rosenthal, S. S., & Strange, W. C. (2020). Employment density and agglomeration economies in tall buildings. *Regional Science and Urban Economics, 84*, 103555.

WASTE MANAGEMENT USING GEOGRAPHIC INFORMATION SYSTEMS: THE CASE OF KADIKOY

MELDA KARADEMİR, BUKET AYŞEGÜL ÖZBAKIR

Melda Karademir, Ph.D. Student, Yıldız Technical University, **Buket Ayşegül Özbakır,** Prof. Dr., Yıldız Technical University.

ABSTRACT

With the Industrial Revolution, developing technologies, increasing population, rapid urbanization and increasing waste amounts appear as one of the most important problems of cities. Globally, more than 1.3 billion tons of municipal solid waste is produced annually. In the report published by the World Bank in 2012, it is predicted that approximately 2.2 kg of waste will be produced per person in 2025 (Hornweg and Bhada-Tata, 2012). 23% of the waste generated in Turkey is the waste in Istanbul. Only 12.3% of the generated waste can be recycled (Öztürk, 2017). Most of the waste generated in our country is disposed of in landfills. In the approach to waste disposal, energy consumption increases, and methane gas, which is one of the greenhouse gases that negatively affects climate change, may also be released. It is known that 32% of methane production in European countries originates from landfills (Karkanias, 2014). Instead of using our limited resources efficiently, the disposal of wastes with recyclable content in landfills adversely affects the economy. causes visual pollution. In addition, the traffic of the vehicles carrying the wastes causes the current transportation problem to increase. The production of waste is usually the final result of the extraction, processing and use of natural resources. In the management of wastes generated as a result of these processes, a method compatible with sustainability targets is followed by abandoning the disposal approach, especially in European countries, and ensuring the effective use of recyclable wastes that contribute to the circular economy in the current system. With the integration of innovative approaches into waste management systems, a more efficient waste management can be realized in terms of environmental, economic and social aspects, as well as providing more efficient data use. In today's information age, with the use of Remote Sensing and Geographical Information Systems, a new generation waste management approach can be developed to increase the recycling rate of waste.

Keywords: Waste Management, Sustainability, Geographic Information Systems, Kadıköy

INTRODUCTION

While today's metropolitan cities are transforming into information age cities, some functions they contain disappear, some are changing and some new functions are added to the city. With this change, the traditional classification of sectors defined also differs and some sectors are divided by specialization. It can be said that this specialization in the sectors has the potential to create radical changes in the structures of metropolitan cities (Onay, 2011).

According to OECD (Organization for Economic Cooperation and Development), waste means "the producer; It is defined as a substance that is not used for production, consumption or transformation purposes, must be thrown away and cannot be used as a product". In the Environmental Law No. 2872 dated 1983, waste is defined as "any substance that is generated as a result of any activity, released into the environment or thrown away". According to the "Waste Management Regulation" dated 2015 and numbered 29314, waste; It is defined as "any substance or material that is thrown or released into the environment or has to be disposed of by the manufacturer or the real or legal person who actually holds it". Waste is defined as substances that arise as a result of production and consumption activities and that are deemed necessary to be removed.

In 1996, the UN United Nations Environment Program (UNEP) waste management; It has been defined as "a frame of reference for designing and implementing new waste management systems to analyze and optimize existing systems". Waste management, in its most basic form, is the process of collecting, storing, treating and disposing of wastes in a way that does not harm people, plants, animals, ecology and the environment. "Waste Framework Directive" No. 2008/98/EC, which constitutes the EU Framework Legislation on Waste; reveals the basic concepts and definitions including waste, recycling and recovery of wastes (Dağıdır, 2020). In many industrialized cities, the principle of "Waste Management Hierarchy" is applied (Figure 1).

Figure 1. Waste Management Hierarchy (Waste Framework Directive)

The basic regulation in the field of waste management is the "Waste Framework Directive" numbered 2008/98/EC. Waste management hierarchy is defined in this directive. According to this hierarchy, the primary goal is to reduce the generation of waste. In cases where reduction at source cannot be achieved, materials should be reused, if not reused, they should be recycled. In cases where recycling is not possible, it should be reused with recovery. The last step of waste management is the disposal of wastes that cannot be recovered in any way. The details of the concepts mentioned are as follows:

Reduction: It means prolonging the life of the products, reusing them, reducing the resulting waste, reducing the use of harmful substances in the product composition. It is important that the awareness of preventing and reducing waste is in both individual consumers, that is, people and producers.

Reuse: It is the reuse of wastes in their current form until the end of their economic life without any additional treatment other than collection and cleaning (eg washing and using glass bottles).
Recycling: Recycling is defined as the process of reprocessing the waste and transforming it into another form. In the recycling process, the wastes go through some physical or chemical processes in order to be reused.
Recycling: It can be defined as the conversion of the components inside into different products or energy by physical, chemical or biochemical techniques by taking advantage of the properties of the wastes, including the concepts of reuse and recycling.
Disposal: It can be defined as the phase of disposal of non-recoverable wastes without harming the environment and human health. The most important parameter that will determine the method to be used is the type of waste, therefore it is of great importance to determine the characteristics of the waste correctly before the disposal process.
Ineffective waste management and inappropriate waste disposal is a global problem as it creates environmental problems in urban ecosystems. Due to the lack of quality data, waste management problems continue to be seen especially in developing countries (Singh, 2019, p.22). Increasing solid waste production rate, high management costs and lack of understanding of the factors affecting the different stages of solid waste management are some of the problems faced by municipal authorities in developing countries (Aremu and Vijay., 2016, p.52). It is documented that developing countries spend 20-50% of their normal budgets on solid waste management, but 30-60% of municipal solid waste is not collected and less than half of the population is served (World Bank, 2012).

TYPES OF WASTE

The composition of solid wastes is generally similar. In some cases, it may contain differences depending on geographical, climatic, economic, racial, cultural, social and demographic factors. According to their source, wastes are divided into 6 as domestic, commercial, urban, agricultural, medical and industrial:
Domestic Wastes: Food residues, garbage, which are not included in the scope of hazardous and harmful waste, are the wastes created by other wastes, which are formed as a result of vital activities in residential areas, private residences, apartments, and additionally in industry and commercial places, hospitals.
Commercial Wastes: Food residues, garbage, demolition and repair wastes, ashes and other special wastes originating from shops, markets, restaurants, hotels, business centers, offices, industrial sites, printing presses, hospitals and clinics are included in this group.
Urban Wastes: Urban wastes, on the other hand, are all wastes that include domestic and commercial wastes and that also occur in streets, streets, parks, gardens and playgrounds, and are seen in special environmental protection areas, beaches, sea coasts, highways.
Agricultural Wastes: These are the wastes created by agricultural areas where agricultural activities are carried out such as orchards, farms, vineyards, grain production works, dairy farms. Agricultural wastes, special food wastes, plant wastes and some harmful wastes are in this group.
Medical Wastes: Medical wastes originating from hospitals, clinics and other health institutions. The most important issue regarding medical waste is that it poses a significant threat to the spread of infectious diseases.
Industrial Wastes: These are the wastes generated as a result of activities in all branches of industry, including factories, industrial sector, construction, excavation and repair works, refineries, chemical factories, wood industry, mining and energy sectors (Ekşici, 2020, p.11-12).
Industrial waste can be divided into three groups:
Domestic canteen, cafeteria, office wastes,
Packaging and packaging waste,
These are wastes such as raw material wastes, intermediate products, chemicals, fly ash and slags, casting sands, which are generated as a result of production activities. These wastes include all kinds of chemical, biological, toxic, flammable, combustible and radioactive wastes, meat combinations and odorous wastes produced in other food industries, both at the time they are thrown and over time (Atmaca, 2004).
Recyclable wastes can be basically said as glass, plastic, metal, paper, textile, electronic waste, waste batteries, vegetable oil and wood. The type of waste that is 100% recyclable is glass. It can be reused for the purpose it was used before it is waste after recycling processes. Various projects are being developed to raise awareness about recycling.
Waste management is a globally observable phenomenon, and if not adequately controlled, it creates a major environmental problem. If planning is not done for the wastes that cause both economic and environmental difficulties, serious problems may arise. New technologies are being developed to improve

waste management systems. Geographic Information Systems is one of the new technologies that contribute a lot to the waste management society in a much shorter time (Thompson, 2013, p.206).

WASTE MANAGEMENT

The annual amount of waste production in the world is calculated as 3.1 billion tons on average. Considering the amount of waste generated, the importance of waste management is increasing day by day. The first step to design a solid waste management plan consists of defining the waste generation and composition patterns of the study area (Gallardo et al., 2014, p.1920). In the study conducted by Zaman in 2016, the world situation of annual per capita waste production is shown on the map (Figure 2).

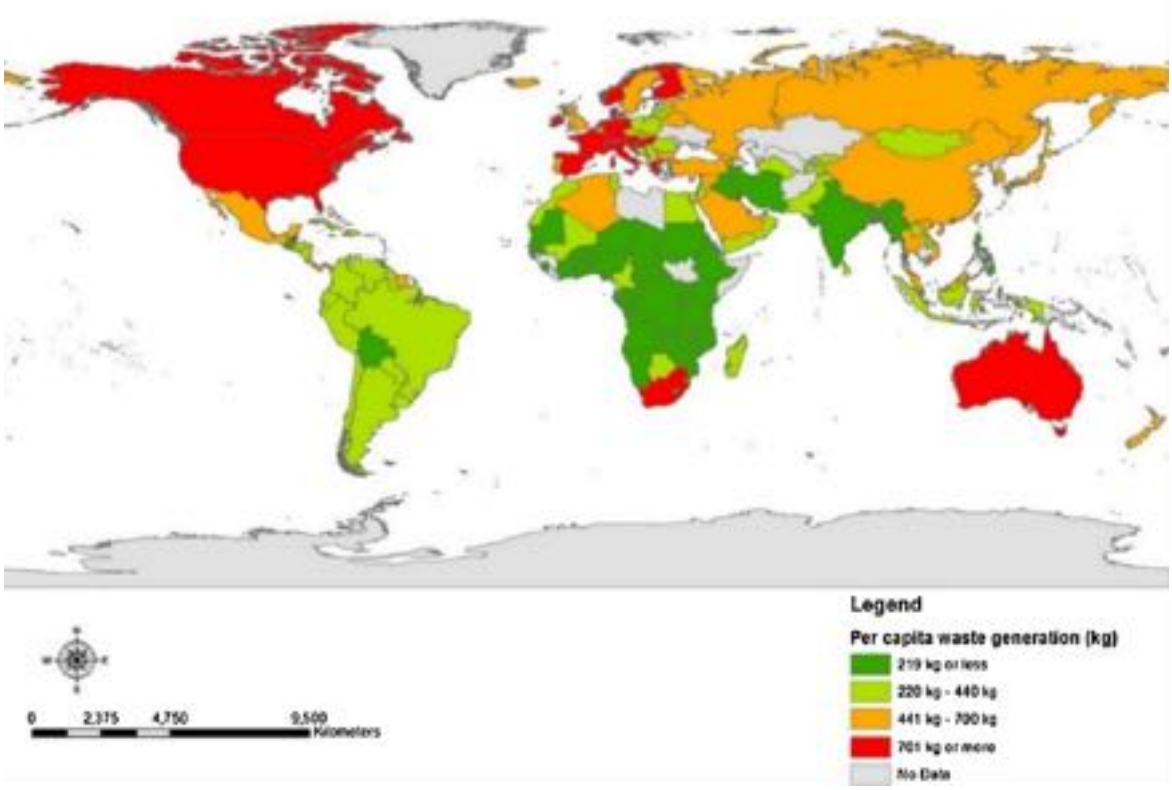


Figure 2. Annual waste generation in different countries (Zaman, 2016, p.35)

When the per capita waste generation in the world is compared, according to the data given in Figure 2, it is known that the countries with an annual per capita waste production of 219 and below, most of the countries in the African continent, India, Iran, Iraq and Bolivia. It is noteworthy that these countries are mostly 3rd world countries. When we look at the countries with annual per capita waste production of 701 kg or more, it is seen that most countries in the North American continent, countries in Europe such as Norway, Finland, Ireland, Germany, France, Spain, Italy, South Africa and Australia. Turkey's annual per capita waste production is stated to be in the range of 441 -700 kg, and it can be said that the waste production is above medium.

According to a study by the World Bank, a waste production projection was made for 2025. According to the currently available data in the table, it is predicted that the daily per capita waste generation will increase from 1.2 kg to 1.4 kg in 2025, and the daily waste production will reach 6.069.703 tons from 3,532,252 tons (Table 1). The necessity of carrying out studies that can reduce or prevent the increasing waste production in parallel with the population growth comes to the fore.

Region	Current Available Data			Projections for 2025			
	Total Urban Population (millions)	Urban Waste Generation		Projected Population		Projected Urban Waste	
		Per Capita (kg/capita/day)	Total (tons/day)	Total Population (millions)	Urban Population (millions)	Per Capita (kg/capita/day)	Total (tons/day)
AFR	260	0.65	169,119	1,152	518	0.85	441,840
EAP	777	0.95	738,958	2,124	1,229	1.5	1,865,379
ECA	227	1.1	254,389	339	239	1.5	354,810

LCR	399	1.1	437,545	681	466	1.6	728,392
MENA	162	1.1	173,545	379	257	1.43	369,320
OECD	729	2.2	1,566,286	1,031	842	2.1	1,742,417
SAR	426	0.45	192,410	1,938	734	0.77	567,545
Total	2,980	1.2	3,532,252	7,644	4,285	1.4	6,069,703

Table 1. Waste Production Projection for 2025 by Regions (World Bank, 2012)

In Table 2, where the recycling rates of different countries are shown, the countries with an annual waste recycling amount of 50 kg or more per capita are most countries in North America, countries in Europe such as Norway, France, Spain; It is known that there are Saudi Arabia and Australia in Asia. Venezuela, Bolivia, which are located in South America, are the countries with an annual per capita waste recycling rate of 5 kg or less; Most countries in South Africa seem to be Turkey, Iraq, Iran and People's Republic of China in Asia. Most countries in North America, Norway, France, Spain and Australia, which have high waste production and high recycling rate, draw attention.

Types of Waste	**Country with Highest Recycling Rate**	**Recycle Rate (%)**	**Country with the Lowest Recycling Rate**	**Recycle Rate (%)**
Electronic Waste	Croatia	81,3	Malta	15,9
Domestic Waste	Germany	67,2	Malta	7,1
Packaging Waste	Belgium	83,8	Malta	39,7
Glass Waste	Belgium	100	Iceland	0,3
Plastic Waste	Lithuania	74,2	Malta	23,5
Paper Waste	Finland	100	Malta	59,7
Metal Waste	Belgium	98,5	Croatia	16,5
Forest Products Wastes	Portugal	89,9	Malta	0
Automobile Waste	Croatia	99,3	Malta	54,4

Table 2. Countries with the Highest, Highest and Lowest Recycling Rates by Waste Types (Fire, 2021, pp. 130)

The first step to design a solid waste management plan consists of defining the waste generation and composition patterns of the study area (Gallardo et al., 2014, p.1920). In this context, detailed analysis results for the study area are shared in the following sections.

According the history of waste management in Turkey, it can be said that the applications on this subject were the Public Health Law No. 1593, which was first enacted in 1930. Within the scope of this law, regulations regarding environmental protection, environmental health and urban cleaning were made. The second application in waste management is the Municipality Law No. 1580, which was put into effect in 1930. Article 19 of the Law emphasizes that wastes are the responsibility of municipalities. After these two laws, the Environmental Law No. 2872 was created in 1982, and direct references are made to wastes and their management.

When the solid waste management of the municipalities is examined, they currently have various duties within the scope of the Zero Waste Regulation. According to the regulation, while the deadline for the completion of the transition to the zero waste management system for the metropolitan district municipalities with a population of 250,000 and above is 31 December 2020, the metropolitan district municipalities with a population below 250,000 and the provincial center district municipalities outside the metropolitan area will complete the transition to the zero waste management system until 31 December 2021 and Provincial, district, town municipalities and special provincial administrations outside the metropolitan city are required to switch to the zero waste management system before 31th December 2020.

The amount of waste produced by an average person in a day in Turkey is calculated as 1.17 kg. The amount of waste across the country is 31 million tons (Öztürk, 2017, p.3). Waste management has gone through different stages until today. Activities for the collection of waste have been socially focused between 1960-1980 and environmentally focused between 1980-1990. After the 1990s, with the different classification of waste types and the emergence of recycling and recovery practices, product-oriented waste collection activities have become widespread (Dağıdır, 2020, p.13).

Solid waste management was first organized within the body of different organizations, at the central and local level, with the legal framework determined in 1930 (Akdoğan and Güleç, 2007, p. 41). It can be said that solid waste management, which has been carried out by the Ministry of Health under the name of "cleaning services" since the first years of the Republic in Turkey, evolved into a more "environmentally focused" approach with the increasing interest in environmental problems all over the world in the 1970s.

Although developed countries formed the basis of solid waste issue in the 1980s, it can be said that the course of solid waste management in Turkey is slower. Harmonization policies carried out with the encouragement of the EU have formed the basis of solid waste management for Turkey. Turkey became a member of the European Environment Agency (EPA) in 2003 within the framework of the EU harmonization process and signed the Kyoto Protocol in 2009. With Turkey's application for EU membership, it seems that solid waste management is tried to be harmonized with EU laws within the framework of the criteria that the country must fulfill.

Kadıköy district, chosen as the study area, is one of the 39 cities of Istanbul. The population of Istanbul in 2021 is 15,840,900. Istanbul is facing various environmental problems with its increasing population. According to the 2019 data on waste recycling, storage and composting in Istanbul, 83% landfill (15,000 tons/day), 11% compost and bio-drying (2,000 tons/day) and 6% packaging waste It is known that the conversion process (1,100 tons/day) was made.

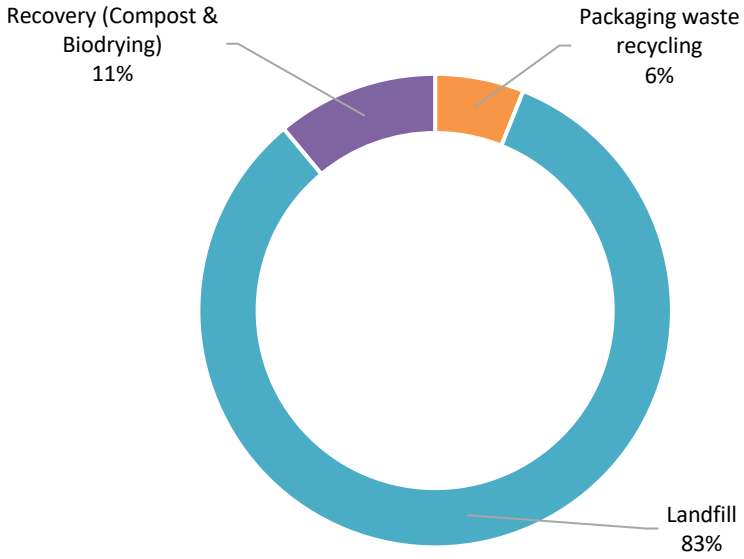


Figure 3. Waste management in Istanbul 2019 (Istanbul Governorship, 2020, p.21)

WASTE MANAGEMENT USING GEOGRAPHIC INFORMATION SYSTEMS

With the implementation of new techniques such as remote sensing and Geographical Information Systems, regional waste management studies have become easier in the last few decades. The use of these techniques in solid waste management supports the rapid and convenient capture, transport and transmission of necessary information. These techniques are also useful in obtaining information directly from a remote location at a very low cost (Singh, 2019, p.22). The study of Singh (2019) revealed that the efficiency of the waste management system can be maximized with the correct use of Remote Sensing and Geographical Information Systems techniques.
The general methodology adopted in waste management modelling with Geographic Information Systems is presented in Figure 4. In the figure, it is possible to collect solid waste data with geospatial techniques, transfer them to a GIS database, and access remote sensing images. By processing the obtained data, a waste management model can be created and the results can be evaluated by analysing the data.

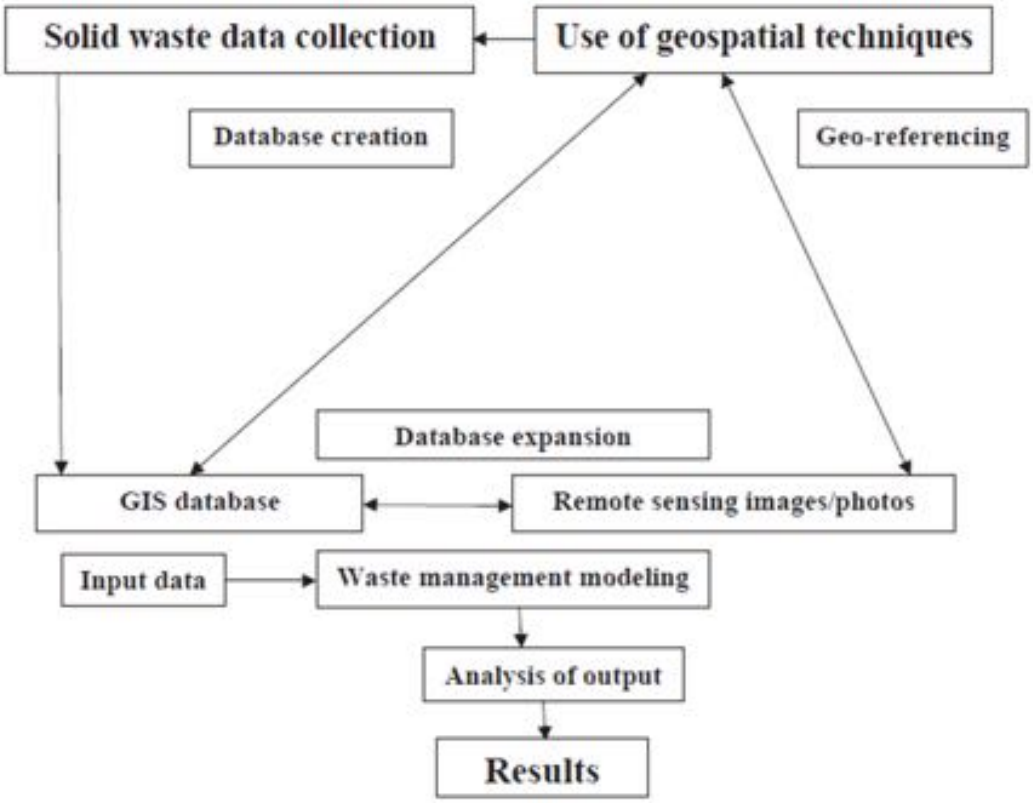


Figure 4. General methodology adopted using GIS and UA in waste management modelling (Singh, 2019, p.25)

In an article published by Singh (2019), the advantages and disadvantages of GIS and Remote Sensing applications and solid waste management are shared (Table 3). According to the table, features such as being able to be used for large-scale studies, efficient use of time, ease of accessibility, and rapid data analysis are listed as the advantages of GIS and IA. The disadvantages of GIS and UA are the requirement for data accuracy, the inability to provide too much detail, and the inability to keep the data in the right location in field research. In general, it seems that the advantage of utilizing GIS and UA tools in waste management is high.

Advantages	**Disadvantages**
Covering large areas	Data field validation requirement
To be able to use time efficiently	Not the best technique for small spaces
Reasonable and cost-effective	Requires professional structures to obtain data
Detection of data with multiple sensors	
Ease of accessibility	
Faster extraction of satellite data	
Fast processing	
Providing fast data transfer	
Fast data analysis	

Table 3. Advantages and disadvantages of solid waste management through GIS and UA (Singh, 2019, p.24)

In Ashkezari's (2018) study, it is aimed to improve the communication network performance in the electrical grid by integrating GIS with Supervisory Control and Data Acquisition (SCADA). It is stated that the proposed Enterprise GIS integration with the smart grid can be easily scaled to improve the operation of power distribution systems, and with the proposed solution, all of the energy consumers, producers and distributors will have real-time information about the power demand and supply in the grid (Ashkezari, 2018, p.33).

STUDY AREA

Kadıköy district is one of 39 districts in Istanbul, located on the Anatolian side of Istanbul, with a population of 485,233 in 2021. It is surrounded by Üsküdar in the northwest, Ataşehir in the northeast, Maltepe in the east, and the Marmara Sea in the west and south. It is a town with a very long coastline on the northwest-southeast axis from Haydarpaşa Train Station to Bostancı neighborhood. The district has an important position in terms of urban transportation. Some of the main transportation routes connecting various districts of the city pass through this district (Figure 5).

In Kadıköy district, summer months are hot and less rainy, winter months are warm and rainy. Its

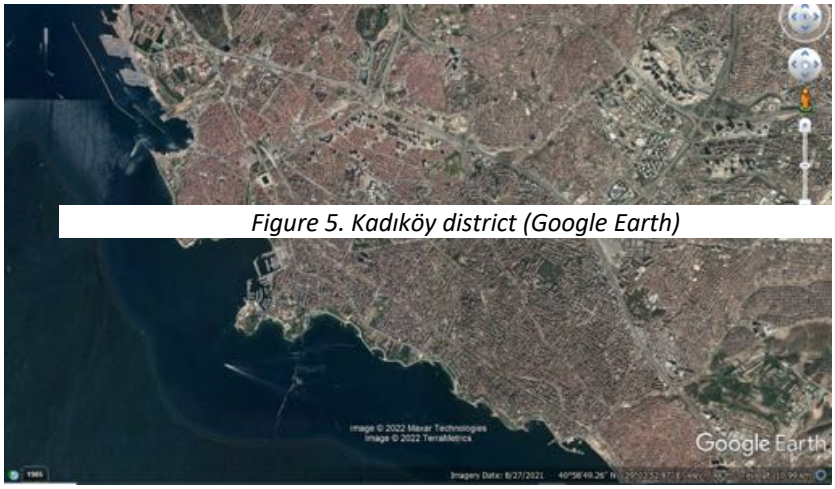


Figure 5. Kadıköy district (Google Earth)

climatic conditions are under the influence of the Marmara Sea. The average temperature is 3°C in the coldest months and 23°C in the warmest months. The annual average temperature is 14°C. The highest temperature was recorded as 41°C and the coldest temperature was recorded as -9°C. The annual precipitation average is 800 millimeters.

The populations of 21 neighborhoods of Kadıköy are shown in Table 4. According to the table, the order of the district according to population densities is as follows: Göztepe, Kozyatağı, Erenköy, Bostancı, 19 May, Merdivenköy, Sahrayıcedit, Acıbadem, Suadiye, Feneryolu, Caferağa, Caddebostan, Fenerbahçe, Hasanpaşa, Eğitim, Rasimpaşa, Fikirtepe, Dumlupınar, Osmanağa, Zühtüpaşa and Koşuyolu.

Neighborhood	**Population**	**Neighborhood**	**Population**
Acıbadem	29,651	Hasanpaşa	15,775
Bostancı	33,819	Koşuyolu	7,163
Caddebostan	21,059	Kozyatağı	37,823
Caferağa	22,760	Merdivenköy	32,516
Dumlupınar	10,501	19 Mayıs	32,794
Eğitim	14,412	Osmanağa	10,023
Erenköy	35,910	Rasimpaşa	13,733
Fenerbahçe	21,059	Sahrayıcedit	31,688
Feneryolu	26,480	Suadiye	27,132
Fikirtepe	11,758	Zühtüpaşa	8,312
Göztepe	40,865		

Table 4. Populations of the neighborhoods of Kadıköy, 2021 (TURKSTAT)

RESULTS AND DISCUSSION

Within the scope of the research carried out within the scope of the doctoral thesis, it was determined that there are 345 recycling boxes for packaging in Kadıköy. It seems that these recycling bins are mainly located in the eastern part of the district (Figure 6). Compared to the population, it is seen that the number of packaging boxes in densely populated areas located in the western part of districts such as Acıbadem and Caferağa, where the highest population is concentrated, is less than in other neighbourhoods.

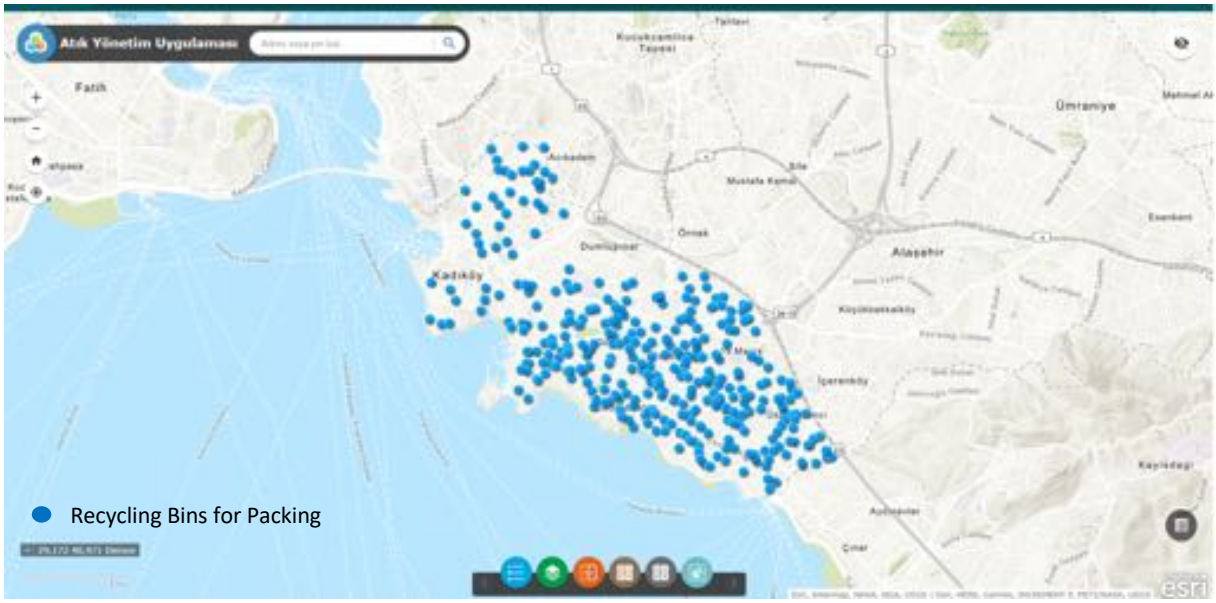


Figure 6. Locations of recycling bins in Kadıköy district

Within the scope of the study, waste management activities in commercial buildings are examined. The distribution of commercial buildings in Kadıköy is shown in Figure 7. In the current system, recyclable wastes are regularly collected from commercial enterprises every week. After the collected wastes are brought in the Waste Retrieval Center, they are separated and sent to the recycling facility.

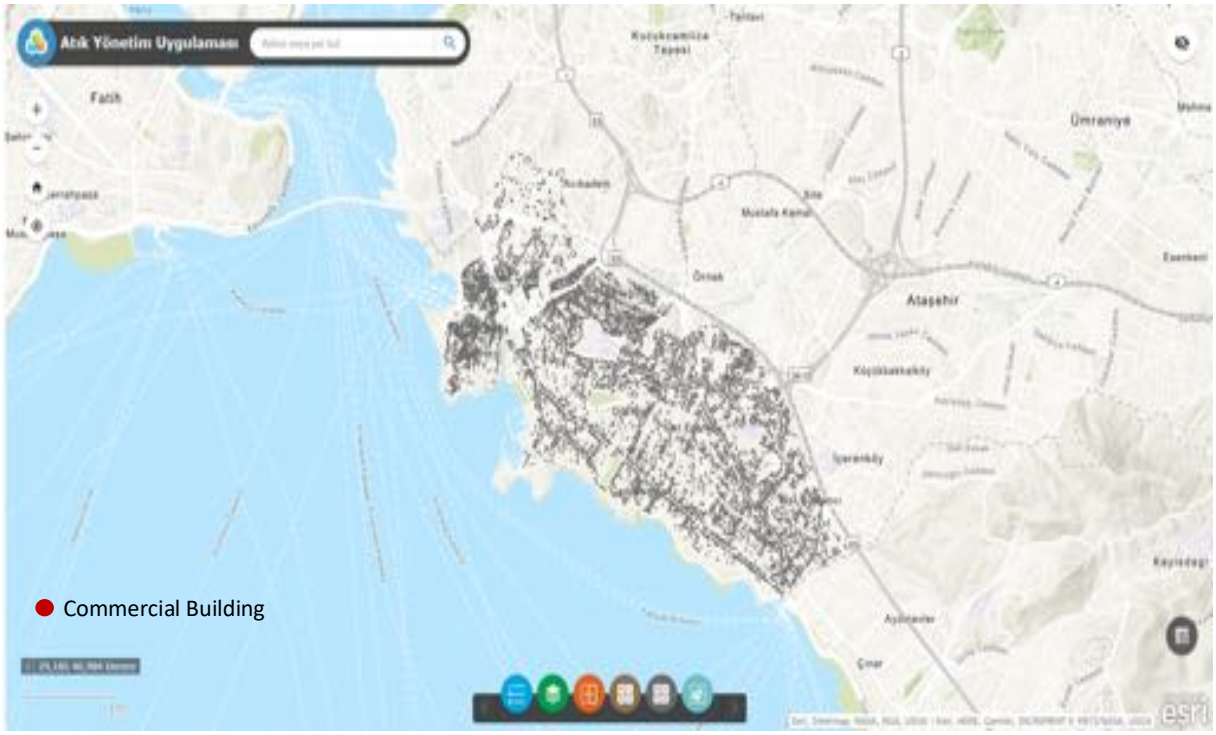


Figure 7. Commercial buildings in Kadıköy district

As a result of the analysis made with Geographic Information Systems, the areas where commercial buildings are concentrated are shown in Figure 8 by using the "heat map" analysis via ArcGIS Pro from Geographic Information Systems. The numbers in the blue circles indicate the locations of the recycling bins for packaging. This analysis shows that packaging boxes are insufficient in the western part of Kadıköy, where there is a dense population and where businesses are concentrated.

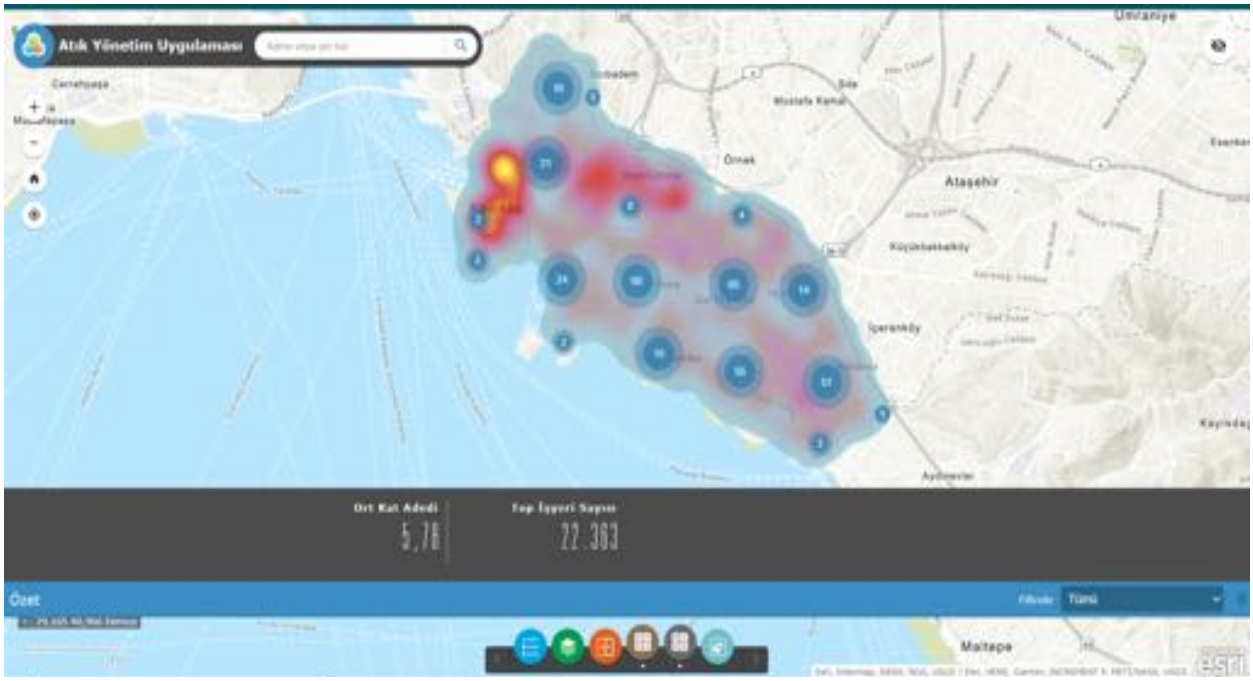


Figure 8. Distribution analysis of commercial buildings and recycling bins in Kadıköy district

CONSLUSION

In the district of Kadıköy, which is the study area, the process of creating a Geographical Information System-based database as a guide for local governments for analyses within the scope of the thesis and waste management for commercial enterprises continues. Developing a solution proposal especially for densely populated municipalities by designing a systematic waste management plan, such as determining the number of piggy bank boxes, customizing the standard size of the piggy bank if necessary, monitoring the real-time waste filling by placing remote sensing sensors using new technology in the piggy banks, taking into account the waste generation behaviour of the public. is intended. It is thought that it will be an important step to strengthen interdepartmental cooperation in terms of governance by spreading such practices throughout the city. While experiencing the negative effects of climate change more and more each day, it is of great importance to manage the waste and recycling issues more effectively by applying more planned and technology-based solutions.

REFERENCES

Akdoğan, A. ve Güleç, S., 2007. *Sürdürülebilir Katı Atık Yönetimi ve Belediyelerde Yöneticilerin Katı Atık Yönetimiyle İlgili Tutum ve Düşüncelerinin Analizine Yönelik Bir Araştırma*. Hacettepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 25 (1), pp. 39-69.

Ashkezari, A.D., Hosseinzadeh, N., Chebli, A. ve Albadi, M., 2018. *Development of an enterprise Geographic Information System (GIS) integrated with smart grid*. Sustainable Energy, Grids and Networks, 14, pp. 25-34.

Ateş, E., 2021. *Döngüsel Ekonomi Kapsamında GSYİH ile Geri Dönüşüm İlişkisi. Avrupa Birliği Ülkeleri Örneği*. Dumlupınar Üniversitesi Sosyal Bilimler Dergisi, 67, pp. 125-137.

Atmaca, E., 2004. *Sivas İli Merkezi Katı Atık Yönetiminin İrdelenmesi ve Yeniden Planlanması*. Doktora Tezi, Cumhuriyet Üniversitesi, pp.1-154.

Dağıdır, S., 2020. *Türkiye'de Katı Atık Yönetimi ve AB ile Karşılaştırılması.*

Ekşici, F. 2020. *Endüstriyel Atık Yönetiminde Kritik Başarı Faktörlerinin AHP Yöntemi ile Önceliklendirilmesi*, Çukurova Üniversitesi, Fen Bilimleri Enstitüsü, Yüksek Lisans Tezi, pp. 11-12.

Gallardo, A., Carlos, M., Peris, M. ve Colomer, F.J., 2014. *Methodology to design a municipal solid waste generation and composition map: A case study*. Waste Management, 34, pp. 1920-1931.

Google Earth Pro, https://www.google.com/earth/about/versions/

Hoornweg, D. ve Bhada-Tata, P., 2012. *What a Waste: A Global Review of Solid Waste Management*. World Bank, Urban Development Series Knowledge Papers, pp. 1-98.

Karkanias, C., Perkoulidis, G., Grigoriadis, N., Staflyas, S., Dagdilelis, E., Feleki, E. ve Moussiopoulos, N., 2014. *Assessing Recycling Potential in Local Level: The Case of Neapoli-Sykies Municipality, Greece*. 4th

International Conference on Environmental Management, Engineering, Planning and Economies (CEMEPE), 24-24th June 2013, Mykonos, Greece, 2884-2889.
Onay, B., 2011. *Bilgi Çağı Kentinin Yapılanmasında Üretici Hizmetleri Yerseçim Kriterleri: İstanbul'da Bankacılık Sektörü Örneği*. İstanbul Teknik University, PhD thesis, pp. 1-175.
Öztürk, M., 2017. *Atık Toplama Miktarı ve Maliyeti %50 Düşebilir*. Çevre Şehir Kütüphanesi.
Singh, A., 2019. *Remote sensing and GIS applications for municipal waste management*. Journal of Environmental Management, 243, pp. 22-29.
T.C. İstanbul Valiliği, Çevre ve Şehircilik İl Müdürlüğü, 2020. *İstanbul İl Sıfır Atık Yönetim Sistemi Planı*, pp.23.
Thompson, A.F., Afolayan, A.H. ve Ibidunmoye, E.O., 2013. *Application of Geographic Information System to Solid Waste Management*. Pan African Conference on Information Science, Computing and Telecommunications, pp. 206-211.
TÜİK, https://www.tuik.gov.tr/
Wikipedia Encyclopedia, https://en.wikipedia.org/wiki/Kadikoy
Zaman, A. U., Swapan, M.S.H., 2016. *Performance evaluation and benchmarking of global waste management systems.* Resources, Conversation and Recycling, 114, pp. 32-41.

RESEARCHING THE NEW URBAN TEXTURE AFTER URBAN TRANSFORMATION IN THE CONTEXT OF SUSTAINABILITY: THE CASE OF ANKARA YENİMAHALLE

MEVLÜT ANIL ŞEN, AYŞEGÜL TANRIVERDİ KAYA

Mevlüt Anıl Şen, Graduate Student, Graduate Education Institute, Faculty of Art Design and Architecture, Department of Architecture, Düzce University
Ayşegül Tanrıverdi Kaya, Asst. Prof., Faculty of Art Design and Architecture, Department of Architecture, Düzce University

ABSTRACT

A rapid and worldwide migration from rural areas to cities has started after the industrial revolution. Immigration pressure has mostly emerged as a problem of rapid urbanization and housing shortage. Additionally, rapid and intense construction, which was offered as a solution to housing needs, caused cities to grow uncontrollably due to wars and natural disasters. Particularly in Turkey, in the 1950s, with the increasing immigration to cities, unlicensed construction and zoning amnesties cause the macroform of cities to spread unprecedentedly. With the effect of globalization, the use of urban space and lifestyles have begun to differentiate. Therefore, the traditional urban texture has begun to change in the urban space. Urban transformation applications in our country have been recently suggested as a solution to these and similar problems. Urban regeneration is a comprehensive project allowing problematic urban environments to be brought back to the city, restore the impaired social, economic and environmental balance, reach safe investment opportunities and be introduced in a multi-participatory and coordinated manner. Today, these projects are mostly handled as the organization of physical space by focusing on real estate with the approach of value increase and sharing, but it is seen that the dimensions of social development, economic development, and environmental and ecological sustainability are ignored respectively. As the results of these practices have been discussed in the recent years, it is claimed that an approach that does not consider sustainable approaches in the resource use negatively affects urban life comfort, human psychology, and health. This study aims to reveal the criteria necessary for the management of urban transformation projects at the planning stage in the axis of urban morphology approach by morphologically addressing the city parts reconstructed after urban transformation practices in the context of sustainability. Hence, the Mehmet Akif Ersoy neighborhood in Yenimahalle district of Ankara, the Capital City where the settlement pattern has changed dramatically as an urban transformation project (2007) was analyzed, and the effect of the transformation on the new urban texture was analyzed in two parts. In the first part of the study, the area transformed from a shanty house to a gated community was examined and discussed in the context of ecological and socio-cultural life from a morphological point of view. Therefore, the urban texture before and after the intervention, effective use of climate and natural resources by passive design strategies have been analyzed with 3D Sun-Path software that was used to examine concepts that suitable location selection and orientation, structuring style, street orientation, and landscaping. The transformation in the urban blocks and street patterns, and changes in building densities were revealed with the morphological analysis. Moreover, the spatial syntax analysis method was performed with the depth map software where the continuity of the urban space by determining the differentiating spatial relations, connectivity, integration, choice, and intelligibility analyzes were carried out. In the second part of the study, the aim was to conduct a survey study on the effect of transformation on perception, especially in the newly formed texture due to the limitation of public access. Finally, the data obtained were interpreted accordingly. This study reflects the information generated at the first stage where the concepts of social and environmental sustainability are considered as the most important criterion rather than economic issues in the urban transformation process.

Keywords: Urban transformation, urban morphology, sustainability, Yenimahalle

INTRODUCTION

Cities are living systems that fulfill all the necessary needs of people and are in constant development (Keleş, 1998). They have always been the center of attraction with their business, education and socio-cultural elements (Kaya, 2019). Upon the revolutions, wars, disasters, etc. in the last 50 years, cities with a population of around 1 million once turned into metropolises and megacities with more than 5 million population today (Başkaya & Yıldızcı, 2011). Therefore, rapid urbanization has brought the housing crisis and cities have been left with many problems (Kutlu & Kaya, 2022). As in the world, the rapid urbanization process in Turkey has dominated several events. The process, which gave its first examples with the urbanization movements in the Republican Period, gained strength with the waves of migration to the cities in the 1950s after the Second World War (Türk, 2016). The consequences of this situation for the cities have been slumming as the first transformation examples of metropolitan cities (Ataöv & Osmay, 2007). Following the rapid construction process, the use of urban space and lifestyles have changed over time and the traditional urban texture has differentiated accordingly (İçli, 2013). With the effect of globalization after the 1980s, housing projects with high investment value focused on the profit motive of local and international capital first on the peripheries of cities and then in urban centers increased and cities spread more than necessary; urban spaces have emerged that are not specific to the location increasing social inequality, exclusion and polarization due to the lack of effective use of resources (Blakely & Synder, 1997; Yazar, 2019). Renovation works were required to solve the problems that emerged for all these reasons and urban transformation practices have recently become a solution such and similar other problems in our country. Urban transformation stands out as a remarkable tool in the axis of planning, designing and reproducing urban areas and it is considered as an important opportunity in the redesign of space (Duman & Zaman, 2021). However, the results of the transformation practices that have recently been implemented or at the planning stage are discussed from many aspects in our country. In the literature, urban transformation studies have been criticized and made visible mostly through the sustainability of the social (socio-economic) system (Duman & Zaman, 2021; Sertkaya vd., 2019; Doğan & Bostan, 2019; Koçancı & Ergun, 2018; Akalın, 2016). The studies mainly concentrated on poverty, spatial segregation/exclusion, gentrification, resource increase/efficiency issues. Koçancı & Ergun (2018) have analyzed the urban transformation process through urban poverty and stated that the rights holders before the transformation cannot pay the housing costs that incur after depending on the socio-economic conditions and that they are forced to move to different parts of the city by not being able to participate in the consumption processes. Akalın (2016), on the other hand, emphasized that it is not meaningful to deal with urban transformation only physically emphasizing the sustainability of urban transformation, and stated that the sine qua non of sustainable urban transformation in practice is the implementation of socio-economic and ecological dimensions of sustainability in projects in coordination. In this context, various studies criticizing urban transformation through the sustainability of the environmental system (Tekedar & Polat, 2020; Ertaş & Bayındır, 2020; Diker, 2019; Kanlı vd., 2017) and highlighting the use of passive systems with an urban morphology approach (Evren, 2022; Beyaztaş, 2021; Deng vd., 2021; Changalvaiee vd., 2017) have attracted the attention. All of the studies revealed that nature, environment, historical and socio-cultural texture are ignored during the efforts to correct economic opportunities in urban transformation processes. In the light of the aforementioned information, this study aims to reveal ecological and socio-cultural criteria rather than economic issues to manage urban transformation applications at the planning stage in the axis of urban morphology approach by considering the urban parts regenerated after urban transformation application morphologically. Hence, the field studies were carried out on the literature information and related concepts explained accordingly. The findings obtained were interpreted and discussed in the conclusion section and an evaluation was made herein.

A BRIEF OVERVIEW OF URBAN TRANSFORMATION

The phenomenon of urban transformation, which started as a result of the Industrial Revolution in the world and the transformation in its unique socio-economic structure and accelerated after the Second World War, and was introduced with slum dwelling in Turkey especially in the 1950s and increased in the 1980s and has an important place in the country's agenda after the recent major earthquakes, is a broad concept that cannot be considered in its purely physical sense today (Kanlı, Eryiğit, & İnce, 2017). The concepts of change and transformation need to be examined to under the whole concept. The concept of change as explained by the Turkish Language Association is "*the whole of the changes in a period of time, change*" while the concept of transformation is "*entering into a different form than it is, taking another state, changing the shape, havvül, revolution, transformation*". The concept of urban transformation is defined as "*the demolition of unlicensed buildings that do not comply with the zoning*

plan of the city and the creation of collective settlement areas in accordance with the plans" (Türk Dil Kurumu, 2022). In the literature, Linchfield (2000) defined the concept of urban transformation as "*consensus on the data obtained in the transformation to be made and arising from the need to better understand urban degradation processes*". Roberts and Skyes (2000) explained "*as a comprehensive and integrated vision and action, it is to ensure the continuous improvement of the physical, social, economic and environmental conditions of a region*".

The phenomenon of transformation is a concept that affects and changes the macro form of the city. By associating the areas with different functions with the city, the use of space within that geography describes intervention in the physical, functional, social, economic and ecological sense. Therefore, a good knowledge of the transformation process is very important for understanding, recognizing and comprehending the development of any city (Günay, 1999). In Turkey as well as in the world; It is possible to divide the urban transformation, the practices of which are mostly carried out by the main actors such as the public, private sector and civil society in large cities, into three periods. The period of 1950-1980, when rural-urban migration increased as a result of industrialization and illegal settlement (slum areas) came to the fore; the period of 1980-2000, when the effect of globalization was felt, and the period after 2000 with the localization encouraged but the influence of the center gained strength (Ataöv & Osmay, 2007). In the approach to urban transformation in the process, nine different forms of intervention have emerged: renewal, rehabilitation, conservation, revitalization, redevelopment, improvement, clearance, infill development, refurbishment (Şişman & Kibaroğlu, 2009). It is the focus of improving the current situation in urban transformation, which includes different categories of targets and is a socio-spatial necessity. From this point of view, instead of approaching the different problems of cities with single and same method solutions in urban transformation projects, it should be aimed to produce appropriate and effective solutions specifically according to settlement and zoning characteristics (Ertaş, 2011). Particularly in the urban transformation process, transformation projects in which social interests, not economic and political interests are prioritized should be planned and implemented (Çakır, 2006). Planned approaches considered in the management and implementation of urban transformation projects are in many respects healthier (Yerliyurt & Aysu, 2008) and ensure that it undergoes a sustainable reproduction process.

SUSTAINABILITY AND URBAN TRANSFORMATION

The concept of sustainability, which is a subject where many different disciplines intersect and defined by each discipline according to its own teachings, is expressed in the first sense as the capacity to continue its existence without interruption or decrease (Diker, 2019). The concept of sustainability (Keleş, 1998) is defined as "*an environmentalist worldview that aims to ensure economic development without sacrificing the principle of using environmental values and natural resources in rational ways that do not lead to extravagance, taking into account the rights and benefits of present and future generations*". Although the concept of sustainability was first explained in 1977 in Dennis Pirages "*Sustainable Society*" (Tekeli, 2001), the historical background of the concept dates to the Ancient Roman Period (Diker, 2019). According to Keleş & Yılmaz (2004), sustainability has existed since mankind preferred south-facing caves to north-facing caves in temperate climates (Özmehmet, 2007). The concept became popular in the axis of the environmental movement after the publication of the report of the World Commission on Environment and Development (Bruntland Commission) titled "*Our Common Future*" in 1987. In the following period, it was adopted globally with the Conference on Environment and Development held in Rio in 1992 (Tekeli, 2001). The core of the sustainability phenomenon is the establishment of a relationship between society (socio-economic system under the management of people), which are the two sub-branches of the ecological system that constitutes the built environment, and the environment (non-human living beings and non-living things) in the right way (Tekeli, 2001). From this point of view, although various associations have been made regarding the concept of sustainability in the process under the literature, three different dimensions have been met with the field and target in which the concept is used as social, economic and environmental dimension (Tekedar & Polat, 2020).

The concept of sustainability started to be articulated in urban transformation policies and projects after 1990, which is called the regeneration period in the urban transformation process (Roberts & Sykes, 2000). The integration of sustainability into urban transformation is called "*sustainable urban transformation*" to ensure the sound delivery of social, economic and environmental quality of the society to the future generations (Ng, Cook & Chui, 2001). Sustainable urban transformation, in addition to expressing the development or change of urban spaces (Ertaş & Bayındır, 2020) is based on the situation where economic vitality, environmental protection and social justice are simultaneously present (Weinberg, 2000). In this process, environmentally friendly, ecological urban development models have been brought to the agenda in many countries to combat global warming and urban transformation

projects have started to be handled in this direction (Balaban, 2013). Moreover, the building sector has globally entered a green transformation and within this framework, applications have developed in sustainable architecture with names such as green, ecological, smart, passive, carbon zero building etc. (Emel & Şenyiğit, 2018). In parallel with urbanization, the focus was on passive systems by bringing climatic design to the forefront in newly developing sustainable building systems, the use of mechanical systems was reduced, and energy efficiency was increased in buildings (Dizdar, 2009). Passive design, although used as a strategy today, also contributes to all levels of sustainable development (Yüksel & Çerçi, 2019).

URBAN MORPHOLOGY

Cities, together with different economic activities such as industry, trade, services in general, are residential areas where all kinds of products, including agricultural products, are distributed, their borders are determined and their population is concentrated in one area (Kaya, 2019). The famous urbanist Lewis Mumford, in his work The Culture of Cities, says, "*The city is the place where the culture and power of a community are concentrated, a product of time, an accumulation*." Cities, which are really the result of an accumulation, together with all their changes and transformations, are the spatial reflection of the physical, social, cultural and economic conditions of the environment where they are born (Uğurlu, 2010). Within this reflection of the city, cities, which have undergone changes over time, just like living organisms, have been in a continuous transformation through expanding and contracting (Tekkanat & Türkmen, 2018). Cities that present the qualities of the period that we live with their spatial lines experience these transformations with the physical changes that occur in the spaces (Şendur, 2010). The differentiation that these physical changes have undergone over time is resolved from the texture around the city, that is, from the morphology of the city (Gürer, 2016). Urban morphology, in addition to the feature of an approach that enables to analyze the form of human habitats, processes of their occurrence and transformation, the historical development processes of spatial structure and character, and the segments that regulate settlements; it is a method preferred in determining the change processes of urban textures, defining the historical roots of spatial and functional structures and transferring them to the time we live in (Ünver, 2016). Urban morphology used to understand and classify the urban differentiation process can be considered as an accumulation and living organism shaped by the physical environment and the socio-cultural/economic factors that constitute it (Moudon, 1997).
Rapoport said, "*Housing formations are not only the result of physical factors, but also a reflection of all socio-cultural factors. When considering the factors that affect the forms of housing, it is necessary to consider them as a physical part of the ideal environment. At the same time, dwellings can be thought of as a physical mechanism for creating and transmitting worldview*." Pursuant to M.R.G. Conzen (1981), city is a close life space that owes its morphology to social functional needs. Conzen noted that the relationship and interaction between a city and its residents are effective in shaping the urban structure (Whitehand, 2007). According to Kropf (2014), many elements such as historical events, social movements, population, geography, religion, ethnic structure, geography can be listed in the formation of cities. Stating that the user does not want to break the relationship with their past and traditions, Alexander (1965) draws attention to the fact that a physical space acquires a unique meaning with social relations. "*The user adds meaning and character to the physical environment by transferring his experiences and background to the city. The change in the needs over time is the reason why the designed forms, their functions and the way they come together are changing*".
There are three different theories that deal with the topic of urban morphology as English, Italian and French. Michael Robert Günter Conzen is the founder of the Anglo-German school of urban morphology (Moudon, 1997). Conzen studied the development of the city throughout the process. This method, which is called the historical geographical approach, is the explanation of the historical process of a certain region by comparing it in the scale of buildings, parcels and streets. Conzen explains the method that used in the subject where he worked on through these concepts that make the urban texture (Conzen, 1960). Therefore, the effects on the newly formed urban parts after the transformation will be discussed through the changes in building islands, buildings and street patterns.

METHOD

Within the scope of the study, the determination of the effect on the new urban texture as a result of the urban transformation project application was revealed by a two-stage study. In the first stage of the study, the sample area was examined and discussed morphologically in the context of ecological and socio-cultural life. For this purpose, a morphological period examination was first conducted for the analysis of morphological changes and transformations in the street, building and building texture that

make the built environment (Table 2). This study uses the approach of Conzen (1960), the leading representative of the English school of morphology schools, and spatial character analysis, transformation in island, street and land patterns and changes in building densities were examined through aerial photographs, zoning plans and town maps. Considering the different time periods and intervals before and after urban transformation, urban textures; building island/street texture analyses, building texture/floor number analyses and building footprint analyses were performed and compared (Table 3). Then, passive design strategies were used to determine the ecological changes in the area where physical evaluations were made. For the effective use of climate and natural resources under strategies, the concepts such as appropriate location selection and orientation, construction style, street orientation, landscaping were examined and sun-shadow analysis was performed with the 3D Sun-Path program. The analyzes evaluated with the information from the solar, wind and literature are explained together in the findings section (Table 5 and 6). A table was created to learn the extent to which passive design strategies are utilized and/or protected from solar and wind energy at the settlement area scale and the strategies that have been analyzed were evaluated as a result (Table 7). Three different colors were used to evaluate the parameters in the application of the table where the green means that the structure has the specified feature, the orange means that the structure partially carries the specified feature, and the red means that the structure does not have the specified feature. In this context, space syntax analyzes were carried out to determine the spatial relations that differ after urban transformation. Urban textures before and after urban transformation with Depth map, continuity of urban space; connectivity, integration, choice and intelligibility analyses were performed. Axial maps were created after the zoning plan and existing map data obtained from Yenimahalle Municipality before and after urban transformation were transferred to the depthMapX program. The numerically obtained data from each axial map analyzed were examined and spatial interpretations were made in a comparative manner (Table 4). Depth map is a set of techniques used in the analysis of the relationship between spaces and human movements in buildings and urban areas (Url-5, 2022). Hillier's (1998) work on space syntax proposed in architectural approaches in urban morphology. His studies on space are brought together with theoretical comprehension processes, and he has linked experimental observations with computer support by adding the connection of statistical data with formal definitions of texture (Hillier & Hanson, 1998). This method known as space reading and introduced in the 1970s, is used to define the spatial models of regions, cities, built environments, building groups at different scales, organization of space within the structure and their interactions with the social structure (Gündoğdu, 2014). Connectivity and integration from the variables are two important concepts in spatial syntax that enable the interpretation of the relationship between the spaces and socio-cultural characteristics of a settlement. Connectivity is a numerical measurement of how many lines are connected to each line of the system (Hillier, 1996). In the interpretation with colors, the spaces deepen as we go from red, which is the highest value, to blue, which is the lowest value (Hillier, Hanson, Peponis, Hudson, & Burdett, 1983). The integration questions whether each line in the city grid is used in the system. Integration provides an understanding of how deep or shallow the system is (Gökce & Kaya, 2020). The integration value is explained by global and local measurements. Global integration is defined as 1/RRA (Real Relative Asymmetry) and is calculated based on Radius (R-n) integration. Values above 1 signify strong integration while the values between 0.4 and 0.6 mean decomposition. Local integration, on the other hand, considers the relationship of a region to lines at a depth of three places to it and is calculated using Radius 3 (R-3) or different figures. Global integration considers the entire system structure, while local integration provides an understanding of the regional system (Kim & Sohn, 2002). The integration value gives designers the opportunity to anticipate mobility in the region (Altınöz, 2003). Choice is a global measurement of how many direct paths connecting all other possible pairs of spaces within the system pass through that space. Intelligibility means understanding how much of the system can be seen from within a system from the user's location (Altınöz, 2003). The value of intelligibility is related to the degree which a system is fully comprehensible. Intelligibility is measured according to the correlation between connectivity and integration values. The intelligibility value is evaluated based on the R^2 value on scattergrams, which indicates the correlation between the lines. When this value is equal to 1, the curve appears to make a 45-degree angle with the horizontal plane, and the points are clustered. In this case, the degree of intelligibility has reached the best state. In the case when the curve begins to deviate from 45 degrees; R^2 begins to fall below the value of 1, and the spots are scattered that the system has a low correlation (Hillier, 1996).

Table 1. Research Materials.

Research Materials		
Ankara Yenimahalle Municipality	2021	Zoning Plan

		Street Images
		Aerial Photograph
Ankara Metropolitan Municipality	2021	Town Map
Google Earth Pro	2022	Aerial Photograph
Yandex Maps	2022	Aerial Photograph
Author's Own	2021	Street Images

RESEARCH FINDINGS

The area that constitutes the main material of the study is located within the borders of Mehmet Akif Ersoy Neighborhood, Demetevler District of Yenimahalle District of Ankara (Figure 1). Ankara is the capital of the Republic of Turkey and the second most populous city in the country (Url-1, 2022). The city has hosted many civilizations throughout history. It is an important settlement with its history, culture and architectural heritage. With an area of 26.897 km^2, the city is located between latitude 39.57 N and longitude 32.53 E. Its height above sea level is about 890 meters. It is geographically located in the Central Anatolia Region close to the center of the country. The surrounding cities are Eskişehir, Bolu, Kırıkkale, Konya, Aksaray, Çankırı, Kırşehir (Url-2, 2022). With its continental climate, the Ankara's climate differs from place to place. In the south, the steppe climate, which is the distinctive features of the Central Anatolian climate, and in the north, the temperate and rainy states of the Black Sea climate can be seen. Winter temperatures are low in the region and summer is hot. The hottest months are July-August while the coldest month is January. The average temperature on the provincial scale is 11.7 C, the average annual rainfall is 389.1 mm and average pressure value is 913.1 mb. The vegetation is undersized and most often there are steppes. It is seen that the prevailing wind in Ankara varies depending on the land structure where Ankara (center), Esenboğa, Çubuk, Ayaş and Yenimahalle districts go mostly in the northeast direction (Url-1, 2022). Yenimahalle District, which is one of the metropolitan districts of Ankara, was planned as a close settlement area of Ankara by the Mayor of Ankara Ragıp Tüzün at that time with the construction of the city in 1946-1949 with two-storied building in order to make low-income workers and civil servant citizens had housing in 1950. Yenimahalle, which has a rapid development as it is today, became the district center in 1957. It is built on a hilly terrain outside the city center. The population of the district is 703.809, area is 274 km^2 and height from the sea is 830 meters (Url-3, 2022).

Figure 1, 2 and 3. The Location Of The Study Area Within The Country, Province, District and Neighborhood (Url-4, 2022), (Google Earth Pro, 2022), (Yandex Maps, 2022), (Adapted by the author).

The Lower Yahyalar Neighborhood in the north, Macun and Çamlıca Neighborhood in the south, Demetevler Neighborhood in the east and Ostim Neighborhoods in the east surrounding the area(Figure 2). GIMAT Toptancılar Site are located in the south and a shopping mall, in the eastern part of Dr. Abdurrahman Yurtaslan Ankara Oncology Training and Research Hospital. Macunköy Metro Station and ASELSAN are in the west, and there are unbuilt urban working areas in the north. The boundaries of the sample area are in the north direction, which provides traffic to the city center; 314, 336 and 355. The street is south-oriented; Green Crescent Street and in the east direction; 313th Street, westward; 295. It is at the intersection of street axes (Figure 3). At the northern end of the study area there is Ankara Ring Road and it is located between the Istanbul Road and is on the 35 m wide Anatolian Boulevard passing through the north-south central axis of the area. The elevation in its topography increases as you go northeast. The Mehmet Akif Ersoy Neighborhood urban transformation project, which is being discussed, is one of the other Pamuklar and Macunköy Neighborhoods urban transformation projects of Yenimahalle Municipality that has been phased out in the same district. Yenimahalle Municipality, with the slogan "*Urban Transformation That Does Not Migrate Away*" to prevent crooked construction in cooperation with TOKI, Macunköy and Pamuklar Neighborhoods implemented urban transformation projects. In

cooperation with the private sector, Mehmet Akif Ersoy Neighborhood implemented the urban transformation project (Doğan & Bostan, 2019). The study area is a neighborhood where slum settlements were dominant before the intervention, which includes a mosque (Bilal-i Habeş Mosque) and a primary school (Ali Rıza Bey Primary School), surrounded by settlements of different qualities and functions (Figure 4). After the urban transformation, the construction in the region was transformed into a new settlement area within the framework of the laws enacted (Figure 7). "*Mehmet Akif Ersoy Neighborhood; Within the scope of the urban transformation project implemented in 2007, the construction in the region; Within the framework of the laws numbered 5393 (Municipal Law), 2981 (Zoning Amnesty Law in short), 775 (Slum Law) and 2942 (Expropriation Law) and the amended laws numbered 4650 (Law on the Amendment of the Expropriation Law), it is aimed to eliminate the existing distorted settlement areas and to create a new settlement area with modern standards with modern features*" (T.C. Yenimahalle Municipality, 2021). With the urban transformation intervention, 1030 slums were demolished and a texture was created in the area consisting of 3600 residential point and horizontal housing blocks where trade, education and social facilities were designed together and showing the characteristics of closed site settlements (YDA Park Avenue Houses/18 Blocks & Mehmet Akif Ersoy Houses/22 Blocks). With the project, 2% of slum owners have the right to the zoning deed (18 Persons) with the right to property, 54% of the title deed allocation certificate (500 Persons), and 44% of them have the right in accordance with the provisions of the Slum Law No. 775 (406 Persons) (T.C. Yenimahalle Municipality, 2021).

Figure 4, 5, 6 and 7, 8, 9. The Situation Of The Working Area Before and After Urban Transformation, (T.C. Yenimahalle Municipality Institutional Archive) and (Produced By The Author).

MORPHOLOGICAL ANALYSIS OF THE PHYSICAL STRUCTURE

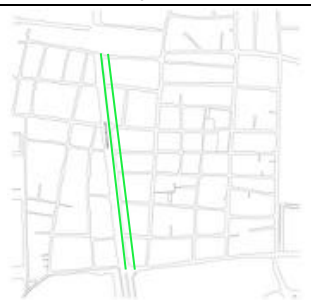
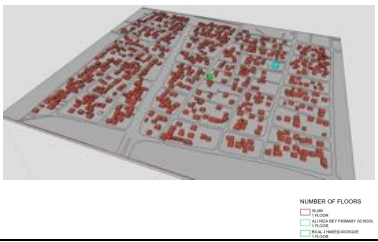
The changes of the urban area in Mehmet Akif Ersoy Neighborhood, which was selected as the study area, can be examined through the morphological periods determined before and after the urban transformation intervention in the light of the aerial photographs (Table 2). According to these examinations, the morphology of the field is seen to have undergone a serious change and transformation over time. In 1987, it is observed that the character of the construction was formed by slum settlement areas as a result of unregistered and distorted construction (Figure 10). With the urban transformation project approved in 2007 after the increasing construction process, the settlement texture has changed dramatically and today the new texture has revealed residential areas including areas with different functions (gated communities) (Figure 15).

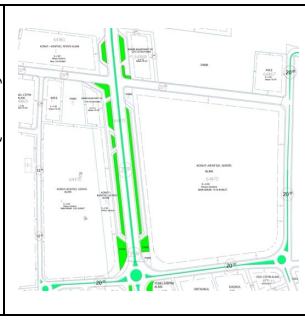
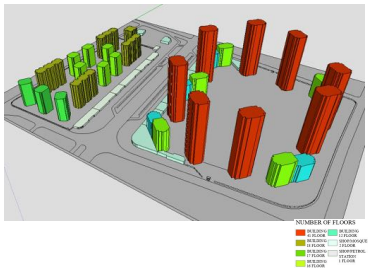
Table 2. Change Of The Field Of Work in The Historical Process, (Figure 10: T.C. Yenimahalle Municipality Institutional Archive), (Figure 11-15: Google Earth Pro, 2022).

		
Figure 10. Aerial Photograph of 1987	Figure 11. Aerial Photograph of 2003	Figure 12. Aerial Photograph of 2007
		
Figure 13. Aerial Photograph of 2012	Figure 14. Aerial Photograph of 2014	Figure 15. Aerial Photograph of 2022

In the following section, building footprint (full-empty) analyzes have been made and compared on the zoning plan and the current plan, which defines the building islands/street texture, building floor numbers and physical features of the buildings such as width, height, height (Table 3). When morphological analyzes are assessed, the streets are narrow, multi-part and there is a street texture with different sizes, mostly parallel to each other and partly grid plan type building blocks in the organic settlement texture before the urban transformation. Building texture is independent of each other, single-storey with a garden. In consideration with the evaluation on post-conversion analyzes, the number of building blocks was combined and decreased, but their spatial dimensions increased. Although the urban corridors as one of the important components in the urban texture, with the changes in the construction of the roads compared to 1995, it was seen that Anadolu Boulevard, which is the axis where the settlement stain spreads, has not changed in the new zoning plan. The closed sites in the building texture consist of buildings with different heights on both sides of the Anadolu Boulevard axis and mostly in a discrete order between 12-41 floors. It was determined that the sites were limited to surrounded by walls, railings, security systems and security guards. Both closed complexes are combined with 1-2 storey commercial areas (shop/store/market). There are different social reinforcement areas and parking areas in the sites.

Table 3. Comparative Morphological Period Review (Ankara Metropolitan Municipality), (Ankara Yenimahalle Municipality), (Produced by the Author).

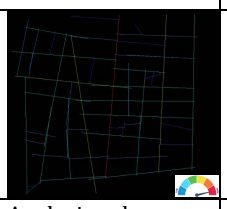
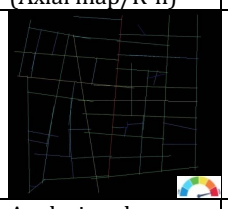
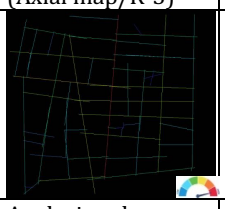
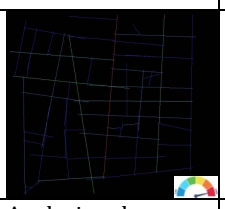
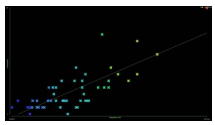
	Building Block and Street Texture Analysis	Building Texture and Number of Floors Analysis	Building Footprint Analysis
Before Urban Transformation (1995)			

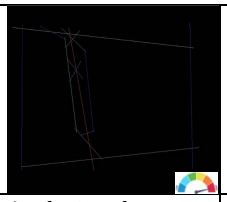
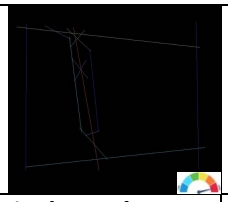
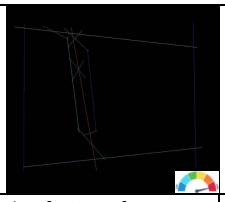
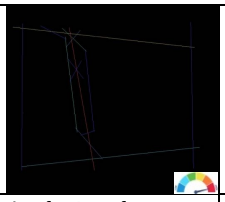
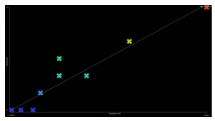
After Urban Transformation (2022)			

MORPHOLOGICAL ANALYSIS OF SOCIAL STRUCTURE

Within the scope of the study, the analyzes made with the DepthmapX program over the maps before and after urban transformation are shown below (Table 4). The highest (Max.) and lowest (Min.) analysis value results of each axial map produced by analyzing the relevant plans are explained under the table. In terms of axial maps, the street with the highest connectivity value in the old texture was a street that passes through the middle axis of the study area in the north-south direction and is shown in red color (Max.: 17). The lowest value street was found to be two side streets in the north direction of the study area with a dark blue color (Min.: 1). In the new texture, it was seen that the street with the highest connectivity value was Anadolu Boulevard (Max.: 8). The street with the lowest value is to the west of Anadolu Boulevard; 295th Street and 355. With the side road connecting to the street is to the east, it was observed that there were two main and two side streets, 313th Street and YDA Park Avenue pocket parking street (Min.: 2). In the old texture, the street with the highest global integration value was a street that passes through the middle axis of the working area in the north-south direction shown in red color (Max.: 3.57). The street with the lowest value was the one side street on the east side of Anadolu Boulevard (Min.: 0.99). In the new texture, the street with the highest global integration value was Anadolu Boulevard (Max.: 4.16) while YDA Park Avenue pocket parking street has the lowest value (Min.: 1.15). Again, in the old texture, it was seen that the street with the highest local integration value was a street that passed through the middle axis of the study area in the north-south direction and was shown in red color (Max.: 3.70). It was seen that the street with the lowest value was one side street on the east side of Anadolu Boulevard (Min.: 1.19). In the new texture, it was seen that the street with the highest local integration value was Anadolu Boulevard (Max.: 4.16). The lowest value street was YDA Park Avenue pocket parking street (Min.: 1.15). In the old texture, it was seen that the street work area with the highest choice value was a street that passed through the middle axis in the north-south direction and was shown in red color (Min.: 0.71). The lowest value street was found to be six blue streets scattered (Min.: 0). In the new texture, it was seen that the street with the highest choice value was Anadolu Boulevard (Max.: 0.62). The lowest street is 313. The street was seen to be YDA Park Avenue pocket parking street and Mehmet Akif Ersoy Sitesi pocket parking street (Min.: 0). When the scatter charts were examined, the R2 value was calculated as 0.629633 in the analysis of the intelligibility in the old texture. The curve in the graph is below 45 degrees, and the dots are scattered. The area is not perfectly understandable. In the new texture, the R2 value was calculated as 0.906379. The curve on the graph is closer to 45 degrees, and the dots are scattered. The area is not perfectly understandable.

Table 4. Comparative Spatial Syntax Analysis and Findings (DepthmapX, 2022).

Period	Variables Considered				
	Connectivity (Axial map)	Integration		Choice (Axial map)	Intelligibility (Scattergram)
		Global Integration (Axial map/R-n)	Local Integration (Axial map/R-3)		
Before Urban Transformation (1995)					
	Analysis value Min.: 1 Max.: 17	Analysis value Min.: 0.99 Max.: 3.57	Analysis value Min.: 1.19 Max.: 3.70	Analysis value Min.: 0 Max.: 0.71	Analysis value R^2: 0.629633

After Urban Transformation (2022)					
	Analysis value Min.: 2 Max.: 8	Analysis value Min.: 1.15 Max.: 4.16	Analysis value Min.: 1.15 Max.: 4.16	Analysis value Min.: 0 Max.: 0.62	Analysis value R^2: 0.906379

MORPHOLOGICAL ANALYSIS OF ECOLOGICAL STRUCTURE

Table 5 presents the solar-shadow and wind analyses. According to the analyzes, the sunshine status is at the appropriate level at all three times in the old texture, both on June 21, which is the summer period, and on December 21, which is the winter period. The buildings and groups of buildings in the old texture are positioned in such a way as not to block and overshadow each other's sun. On June 21, the summer date of the new texture, the solar reception status is at the appropriate level at 12.00. At 09.00 and 15.00 the buildings partially shade each other. December 21, the date of the winter period, has seen to always overshadow each other to different degrees. The prevailing wind blows during the summer season (June-July-August) mostly in the north and northeast direction at an average speed of 11.3 km/h. During the winter season (December-January-February) it blows mostly in the south direction at an average speed of 11.6 km/h. With the data obtained from the analyzes, the use of passive design strategies at the settlement area scale is discussed in Table 6.

Table 5. Comparative Sun-Shadow & Wind Analysis and Findings of the Field at the Summer and Winter Solstice (3D-Sun Path, 2022), (Url-6).

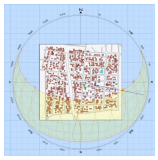
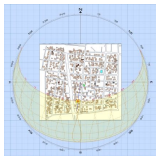
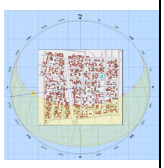
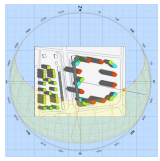
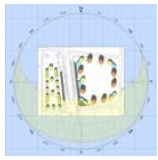
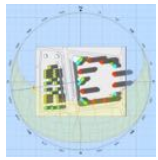
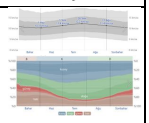
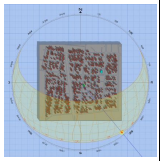
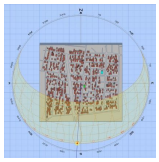
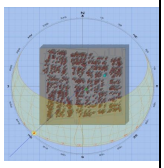
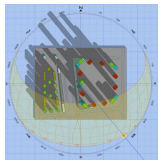
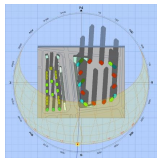
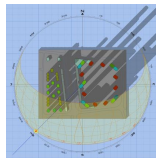
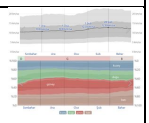
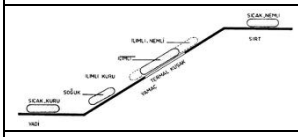
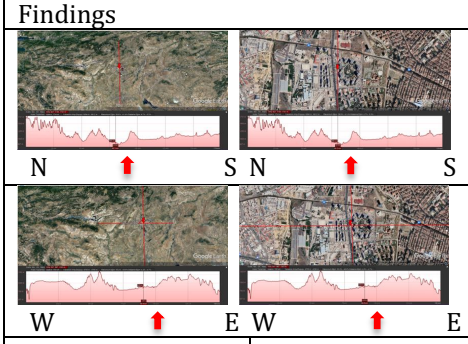
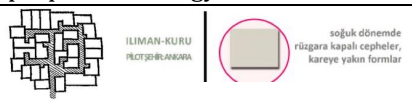
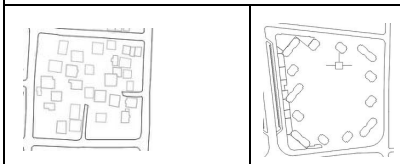
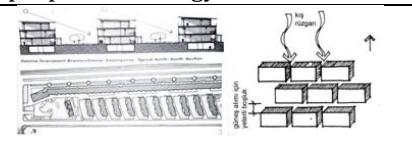
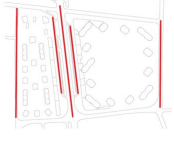
Period	Before Urban Transformation			After Urban Transformation			Wind Analysis (Summer-Winter)
	09.00	12.00	15.00	09.00	12.00	15.00	
21 June							
21 December							

Table 6. Comparative Analysis and Findings of Passive Design Strategies on Solar and Wind Factors at Residential Area Scale (Produced by the Author).

<table>
<tr><td colspan="4">Passive Design Strategies</td></tr>
<tr><td rowspan="6">Appropriate Location Selection and Orientation</td><td colspan="3">Appropriate Strategy</td></tr>
<tr><td colspan="2">  </td><td>For mild-dry climatic zones (like cold climates), the most suitable place on the topography is the parts of the southern slope close to the valley, where solar radiation is high and wind force is low (Zeren, 1978).</td></tr>
<tr><td colspan="3">Findings</td></tr>
<tr><td colspan="2"> 
N S N S
W E W E</td><td>According to land section analysis; Located on a wide plain surrounded by mountains, the elevation in the topography of the study area increases as you go northeast. It was settled on the southern slope of a mountain range rising towards the north of the city and close to the plain floor that was the center of the city. Therefore, it exhibits an advantageous situation for passive heating and cooling. It is a suitable placement in terms of location selection and orientation.</td></tr>
<tr><td>Old Texture
Sun
Wind</td><td>New Texture
Sun
Wind</td><td></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td rowspan="6">Structuring Style</td><td colspan="3">Appropriate Strategy</td></tr>
<tr><td colspan="2"> 
  </td><td>The mild-dry climate zone is characterized by a moderate level of climatic influence throughout the year. Therefore, planning is much free than in other climatic zones. In the mild-dry climate zone (which is like the cold climate zone), the settlement texture should be designed as a compact texture that will allow to benefit from the wind in the period when heating is not desired and to benefit from solar radiation in the period when heating is desired. Buildings should be designed as compact buildings close to the square and closed to the wind during the heating period. Windows that provide temperature control and sloping roofs should be preferred (Özçiftçi, 2010).</td></tr>
<tr><td>Old Texture
Sun
Wind</td><td>New Texture
Sun
Wind</td><td></td></tr>
<tr><td colspan="3">Findings</td></tr>
<tr><td colspan="3">In the old texture where a compact layout texture is seen, the buildings are mostly closed to the wind, in forms close to the square, close to each other, grouped together and positioned in such a way that they do not overshadow each other. Mostly small windows and sloping roofs were preferred. In the new texture, which shows a layout texture that is not close to the compact feature, it is mostly open to wind, close to the square, in a discrete order and the buildings are positioned in such a way that they overshadow each other, especially in the winter period. Not too large windows and a flat (terrace roof) roof were preferred.</td></tr>
<tr><td rowspan="4">Street Orientation</td><td colspan="3">Appropriate Strategy</td></tr>
<tr><td colspan="2"> 
   </td><td>Street orientation should be tailored to the climate of the area under consideration. For example, the microclimate around a building should be at the point of access to the sun and wind. In the mild-dry climatic zone (like the cold climate zone), the streets should be arranged with an east-west orientation to take advantage of the sun. In order to provide a southern orientation to the building groups, the highest level of access should be provided from the passive heating effect of the sun of the structures. The wind factor</td></tr>
<tr><td>Old Texture</td><td>New Texture</td><td></td></tr>
</table>

	Sun 🟢 Wind 🟢	Sun 🟡 Wind 🔴	should be used in urban space if necessary, and in some cases it is necessary to avoid its negative effects. Instead of a grid plan to block the wind, the arrangement of the staggered layout plan increases heat gain (Brown, 2001).
	Findings		
	In the old texture, the main streets are mostly in an east-west direction, angled 5-10 degrees to the south. The buildings are mostly lined up along this line. Looking at the analyses in Table 5, the solar exposure is appropriate and the buildings do not shade each other. Therefore, the street spacing and building heights are suitable accordingly. These situations show that the passive heating effect of the sun is utilized. The north-south oriented streets are placed at close angles in these directions taking into account the north and northeast prevailing winds that are effective during the summer season. This situation can be said to benefit from the passive cooling effect of the wind by providing ventilation in the streets in summer. The surprisingly compact positioning of the buildings is intended to protect against the wind during the winter period. In the new texture, the main streets are mostly in the north-south direction, angled 6-15 degrees to the west. The buildings are mostly lined up along this line. Looking at the analyses in Table 5; Since the sunshine is not suitable especially in the winter period, the buildings often shade each other. Therefore, it can be said that adequate street spacing and building heights are not arranged. This situation causes heat loss in the area. The fact that the buildings are not in order and close to each other poses a risk against wind in the winter period. In particular, the winds coming from different directions to the buildings located on the settlement on the east side of the area (YDA Park Avenue) are thought to create wind shadows behind the buildings, that is, in the urban space within the site, which causes heat losses and therefore reduces the comfort of living.		
Landscape Arrangement	Appropriate Strategy 🔴🟡🟢		
			Landscape can turn into a strategic element that will increase comfort when considered together with the urban texture in a way that will provide wind breaking and shading in the design (Zahoor, 1997). In addition to providing energy efficiency such as passive heating and cooling, it is known to prevent noise pollution with the studies carried out. That's why landscape design is important. In the temperate-dry climate zone, the barrier should be created by combining trees with evergreen (continuous green) and low branches in the north direction of the settlement to protect from the cold winds in winter to protect the landscape design of the open spaces between and around the buildings. Deciduous high-trunked trees should be placed in the east and west directions of the construction, which block solar radiation but allow ventilation in summer. If it is in the south direction, it should be arranged with low shrubs or stunted trees (Koçlar, Oral, 2007).
			
	Old Texture	New Texture	
	Sun 🟢 Wind 🟢	Sun 🔴 Wind 🔴	
	Findings		
	In terms of the subject matter area, the dynamic landscaping on the building islands has a unique character and an outward-looking settlement has been developed in the old texture. In particular, there are deciduous/evergreen plant species in the settlement texture shaped higher than the building roof elevations. The landscape elements were used in different directions around some buildings. In this case, it is not difficult to say that the appropriate strategy has been developed for the most part. In the new texture, modern landscape design techniques are preferred in the nature arrangement of open spaces and plant species with different characters are arranged inwardly. However, it is difficult to say that the building structure is vertical and very high, and it is considered as a means of passive heating or cooling from the landscape.		

🟢 Carries the strategy 🟡 It partially carries the strategy 🔴 Does not carry the strategy

DISCUSSION AND CONCLUSION

This study examines the effect of transformation on the new urban texture in the context of sustainability through considering an urban area where the urban texture has changed after the implementation of the urban transformation project, and the criteria required for the management of urban transformation projects in planning are concluded with field studies and evaluations. The findings of the analysis performed in two stages were shared above and conclusions were drawn in this section respectively. The analyses made on the 3D-Sun Path program and literature review were compared where comments were reflected about their correlation as follows.

According to Table 7, all colors were green before urban transformation, and orange and red were equally common after urban transformation. Therefore, this result showed that the urban texture before the urban transformation passively benefited from solar and wind energy effectively and was more successful in ecological criteria than after the transformation. This situation has shown that it is important to reduce the use of mechanical energy in built environments and use natural resources passively and utilize appropriate strategies in transformation projects. Since the evaluations are at the settlement scale with a limited study, it is foreseen that it will form a basis for other studies in order to better understand the field.

Table 7. Comparative Result Table of Passive Design Strategies on Solar and Wind Factors at Residential Area Scale.

Period	Sun				Wind			
	Appropriate Location Selection and Orientation	Construction Style	Street Orientation	Landscape Arrangement	Appropriate Location Selection and Orientation	Construction Style	Street Orientation	Landscape Arrangement
Before Urban Transformation	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
After Urban Transformation	🟢	🟡	🟡	🔴	🟢	🟡	🔴	🔴
🟢 Carries the strategy	🟡 It partially carries the strategy				🔴 Does not carry the strategy			

The results of the space syntax analysis in the study were compared and comments were noted below about their correlation.

The location of the street that passes through the middle axis in the north-south direction of the working area, which has the highest score in all the variables evaluated before urban transformation shown in red, has changed after the urban transformation and it is the Anadolu Boulevard axis, which has the highest score in all variables. Connectivity and selection are decreasing the highest values especially after urban transformation with the highest values of integration and intelligibility were increased. Similarly, the lowest values of connectivity and global integration increased after urban transformation that local integration and election lowest values decreased. In general, as the urban texture before the urban transformation is moved away from the main axes, the numerical values of connectivity, integration and selection decrease in a balanced way. However, after the urban transformation, it is understood that this situation occurs suddenly outside the street that is the northern border of the area. Therefore, it can be concluded that there was a hierarchical street structure that changed from public to private before urban transformation. For residential areas, this gradation is important in terms of privacy and security. After the urban transformation, the interfaces required in the housing areas show that public-semi-public-semi-private and private spatial transitions cannot be provided. In addition, the global and local integration values are often strong (above 1) in both the old and new texture. The lowest value of global integration has increased compared to the old texture. Therefore, the streets in the new texture are better integrated with the textures of the urban system. However, the lowest value of local integration has decreased compared to the old texture showing that the streets in the new texture are not well integrated regionally. Although it is not possible to say that there is a definite direct proportion between the selection value and the integration value, it has been observed that the selection values of the main streets and axes close to the center of the working area before and after the urban transformation are high. However, according to the analyzes, it was determined that the highest election values after urban transformation decreased compared to the old texture. This shows that the spaces in the new texture are deeper than before. The intelligibility value gives the correlation between connectivity and local integration. Accordingly, some main axes in the working area with the highest connectivity and local integration value before urban transformation (mostly the main axes close to the center; Anadolu Boulevard axis, the street passing through the middle axis and shown in red), it was seen that the intelligibility value was also the highest. After the urban transformation, it was seen that the understandability value of the Anadolu Boulevard axis was the highest. Before and after urban transformation, both regions are not perfectly understandable. However, according to the analysis of the distribution graphs, the numerical degree of intelligibility after urban transformation was higher than before. Consequently, it can be said that the urban texture before urban transformation offers its users more spatial transition and more mobility according to the new texture based on the relationship between urban shaping and social structure, although it does not have perfectly understandable streets. Pursuant to all of the evaluations under this study, plans should be made in which physical, social, economic and environmental dimensions are evaluated together when considering urban transformation projects. Urban transformation interventions should not foresee only a physical transformation or only earthquake-resistant structures. Criteria that do not ignore the past, culture, socio-economic processes, human relationship with the environment, sense of belonging and sustainable approaches should be targeted accordingly. Hence, the issue should be addressed during further zoning studies. For instance, the details should be taken into consideration until the wide facades of the buildings face south and the parcellation is made so that they have intermediate distances and heights that will not overshadow each

other in the arrangement of the street axes in the east-west and north-south directions. Transformation projects should be planned and implemented in a way to bring these goals to the forefront.

REFERENCES

Akalın, M. (2016). *Kentsel dönüşümün karanlık yüzü: soylulaştırma, yerinden edilme ve mekânsal dışlanma*. Bartın Üniversitesi İİ BF Dergisi, 7(14), 287-320.

Alexander, C. (1965). *Community and privacy: toward a new architecture of humanism.* Garden City, NJ: Anchor Books: Doubleday.

Altınöz, G. (2003). *Mekansal dizim yöntemiyle kentsel dokuda biçimsel analiz: Amasya örneği.* Yüksek Lisans Tezi , İstanbul Teknik Üniversitesi Fen Bilimleri Enstitüsü, İstanbul.

Ataöv, A., & Osmay, S. (2007). *Türkiye'de kentsel dönüşüme yöntemsel bir yaklaşım*. METU JFA, 24(2), 57-82.

Balaban, O. (2013). *Neoliberal yeniden yapılanmanın türkiye kentleşmesine bir diğer armağanı: kentsel dönüşümde güncelin gerisinde kalma*k, İstanbul: Müstesna Şehrin İstisna Hali. 51-78. ((. A. Çavdar, Dü.) İstanbul: Pelin Tan, Sel Yayıncılık.

Başkaya, F. A., & Yıldızcı, A. C. (2011). *İstanbul kenti katı atık alanlarının peyzaj planlaması açısından değerlendirilmesi*. İTÜ Dergisi/a: Mimarlık Planlama ve Tasarım, 10(1), 116-124.

Beyaztaş, H. (2021). *Yerinde dönüşüm bağlamında kent dokusu ve enerji tüketimi ilişkisinin incelenmesi:kadıköy vaka çalışması*. The Turkish Online Journal of Design Art and Communication, 11(1).

Blakely, E. J., & Snyder, M. G. (1997). *Fortress America: gated communities in United States*. Brookings Institution Press. Washington D.C.

Brown, G. Z. (2001). *Sun, Wind,&Light : Architectural Design Strategies* , New York: Wiley.

Changalvaiee, Y., Behzadfar, M., Mohammadi, M., & Saeideh Z, Z. S. (2017). *Urban morphology and energy performances: ınvestigating the ımpacts of urban openness factor on theoretical energy demand, case study: ısfahan urban morphological types*. Armanshahr Architecture & Urban Development, 10(18), 133-147.

Conzen, M. (1960). *Alnwick, Northumberland: A study in town-plan analysis.* Transactions and Papers (Institute of British Geographers), London.

Çakır, N. (2006). *Günümüz kent dinamiklerinin kentsel dönüşüme etkileri.* Fen Bilimleri Enstitüsü, İstanbul Teknik Üniversitesi, İstanbul.

Deng, J. Y., Wong, N. H., & Zheng, X. (2021). *Effects of street geometries on building cooling demand in Nanjing, China.* Renewable and Sustainable Energy Reviews, 142(110862).

Diker, B. (2019). *Kentsel dönüşümde çevresel sürdürülebilirlik üzerine bir araştırma*. idealkent, 10(27), 594-629.

Dizdar, H. (2009). *İklimsel tasarım parametreleri açısından geleneksel ve yeni konutların değerlendirilmesi: Diyarbakır örneği.* Yüksek Lisans Tezi, İstanbul Teknik Üniversitesi Fen Bilimleri Enstitüsü, İstanbul.

Doğan, M., & Bostan, H. (2019). *Kentsel dönüşümün nüfusun sosyo-ekonomik yapısı üzerindeki etkileri: Ankara Yenimahalle örneği*. Uluslararası Yönetim Akademisi Dergisi, 2(1), 64-89.

Duman, S., & Zaman, S. (2021). *Kentsel morfoloji açısından bir kentsel dönüşüm projesinin incelenmesi (Bursa İli Nilüfer İlçesi Ataevler Mahallesi örneği*. Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 25(1), 113-142.

Emel, P., & Şenyiğit, Ö. (2018). *Ekolojik ve sürdürülebilir mimarlıkta ekolojik değerlendirme yöntemleri*. Ç.Ü Fen ve Mühendislik Bilimleri Dergisi, 36(7).

Ertaş, M. (2011). *Kentsel dönüşüm çalışmalarında sosyal boyutun incelenmesi: Ankara ve Londra örnekleri*. Selçuk-Teknik Dergisi, 10(1), 1-18.

Ertaş, M., & Bayındır, Ö. (2020). *Sürdürülebilir kentsel dönüşüm*. Türkiye Arazi Yönetimi Dergisi, 2(1), 1-9.

Evren, M. B. (2022). *Doğrultulu günışığı bağlamında yapı adasında morfolojik değerlendirme: Şirinevler Mahallesi.* Türkiye Kentsel Morfoloji Araştırma Ağı III. Kentsel Morfoloji Sempozyumu, Kentsel Morfoloji Ağı, 649-665.

Gökce, D., & Kaya, A. (2020). *Geleneksel kırsal konut tipolojileri üzerinden kültür-mekân ilişkilerinin mekân dizimi yöntemiyle incelenmesi: Düzce İli örneği*. Tasarım Kuram, 16(31), 36-56.

Günay, B. (1999). *Urban desing is a public policy*. ODTÜ Mimarlık Fakültesi Yayınları.

Gündoğdu, M. (2014). *Mekan dizimi analiz yöntemi ve araştırma konuları (Space Syntax and researching ıssues)*. Art-Sanat Dergisi, 2, 251-274.

Gürer, T. K. (2016). *Tipomorfoloji: kentsel mekânın yapısını anlamak.* İdealkent-Kent Araştırmaları Dergisi, 7(18), 8-21.

Hillier, B. (1996). *Space is the machine*. Cambridge, UK.

Hillier, B., & Hanson, J. (1998). *Space syntax as a research programme*. Urban morphology, 2(2), 108-110.

Hillier, B., Hanson, J., Peponis, J., Hudson, J., & Burdett, R. (1983). *Space Syntax, a different urban perspective*. The Architects Journal(178), 47-63.

İçli, G. (2013). *Kentsel yapılı çevrenin üretimi ve yeni mekansal dinamikler: kentsel dönüşüm üzerine sosyolojik bir değerlendirme.* Sosyal ve Beşeri Bilimler Dergisi, 5(1), 247-257.
Kanlı, İ. B., Eryiğit, B. H., & İnce, N. (2017). *Kentsel dönüşümün yaşamsal ölçeği: sosyal hücreler*. Yerel Yönetimler Üzerine Seçme Yazılar, 145-178.
Kaya, A. (2019). *Afetler ve kent morfolojisine etkileri: Düzce örneği*. idealkent, 10(28), 942-961.
Keleş, R. (1998). *Kentbilim terimleri sözlüğü* 2. Baskı. Ankara: İmge Kitabevi Yayınları.
Kim, H.-K., & Sohn, D. W. (2002). *An analysis of the relationship between land use density of office buildings and urban street configuration: Case studies of two areas in Seoul by space syntax analysis.* Pergamon, 19(6), 409-418.
Koçancı, M., & Ergun, C. (2018). *Kent yoksulluğunun kentsel dönüşüm üzerinden okunması.* Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 23(1), 51-68.
Koçlar, Oral, G. (2007). *Ekolojik Yaklaşımda İklimle Dengeli Yapı Tasarımı.* Tasarım.
Kropf, K. (2014). *Ambiguity in the definition of built form*. Urban morphology, 18(1), 41-57.
Kutlu, S., & Kaya, A. (2022). *Kentsel dönüşüm alanlarının morfolojik boyutta incelenmesi" Kemaliye Mahallesi kentsel dönüşüm örneği*. Türkiye Kentsel Morfoloji Ağı, 855-873.
Lichfield, D. (2000). *Organization and management: in urban regeneration a handbook.* (P. R. Sykes, Dü.) London: Sage Publications.
Moudon, A. V. (1997). *Urban morphology as an emerging interdisciplinary field.* Urban Morphology(1), 3-10.
Ng, M. K., Cook, A., & Chui, E. W. (2001). *The road not travelled: a sustainable urban regeneration strategy for Hong Kong*. 16(2), 171-183.
Orhon, İ. (1987). *Toplu konut işletmesi 1: proje planlama-tasarım el kitabı.* Tübitak Yapı Araştırma Enstitüsü.
Özçiftçi, S. A. (2010). *Ekolojik binalarda enerjinin etkin kullanılmasının irdelenmesi.* Dokuz Eylül Üniversitesi Fen Bilimleri Enstitüsü. İzmir.
Özmehmet, E. (2007). *Avrupa ve Türkiye'de sürdürülebilir mimarlık anlayışına eleştirel bir bakış.* Yaşar Üniversitesi E-Dergisi, 2(7), 809-826.
Rapoport, A. (1969). *House Form and Culture.* Engelwood Cliffs.
Roberts, P., & Sykes, H. (2000). *The evolution, definition and purpose of urban regeneration.* (P. R. Sykes, Dü.) Urban Regeneration A Handbook. London: SAGE Publications.
Sertkaya, Z. R., Gençoğlan, M. E., & Sezgin, M. (2019). *The importance of vision and strategy in urban transformation: a critical perspective on application examples in Adana/Seyhan District.* Kent, İnşaat ve Ekonomi Kongresi.
Şendur, S. (2010). *Kadıköy-Yeldeğirmeni Semti mimarisinin tipomorfoloji yöntemiyle incelenmesi.* Yüksek Lisans Tezi, Yıldız Teknik Üniversitesi Fen Bilimleri Enstitüsü, İstanbul.
Şişman, A., & Kibaroğlu, D. (2009*). Dünya'da ve Türkiye'de kentsel dönüşüm uygulamaları*.
T.C. Yenimahalle Municipality. (2021, 05 09). İmar ve Şehircilik Müdürlüğü Kurumsal Arşiv.
Tekedar, B., & Polat, E. (2020). *Sürdürülebilir kentsel dönüşüm çerçevesinde Isparta kent merkezinin incelenmesi*. Journal of Architectural Sciences and Applications, 5(1), 35-49.
Tekeli, İ. (2001). *Sürdürülebilirlik kavramı üzerine irdelemeler.* Mülkiyeliler Birliği Yayınları, 729-746.
Tekkanat, S. S., & Türkmen, S. N. (2018). *Tarih boyunca kent formlarının biçimlenişi üzerine bir inceleme.* Aksaray Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 10(4), 107-124.
Türk Dil Kurumu. (2022, 09 02). *T.C. Atatürk, Kültür, Dil ve Tarih Yüksek Kurumu Türk Dil Kurumu*. http://www.tdk.gov.tr adresinden alınmıştır
Türk, E. (2016). *Hızlı kentleşme sürecinin toplumsal yapıya etkileri: Batman örneği.* Doktora Tezi, Sakarya Üniversitesi Sosyal Bilimler Enstitüsü, Sakarya.
Uğurlu, Ö. (2010). *Kentlerin tarihsel gelişimi.* Kent Sosyolojisi Çalışmaları, 10-33.
Url-1. (2022). *T.C. Ankara Valiliği*. 09 20, 2022 tarihinde http://www.ankara.gov.tr/nufus-ve-idari-durum adresinden alındı
Url-2. (2022). *T.C. Kültür ve Turizm Bakanlığı*. 09 20, 2022 tarihinde https://ankara.ktb.gov.tr/TR-152389/ankara-tarihce-ve-diger-bilgiler.html adresinden alındı
Url-3. (2022). *T.C. Yenimahalle Kaymakamlığı*. 05 16, 2022 tarihinde http://www.yenimahalle.gov.tr/tarihcemiz adresinden alındı
Url-4. (2022). *CoğrafyaHarita*. 09 23, 2022 tarihinde http://cografyaharita.com/haritalarim/4l-ankara-ili-haritasi.png adresinden alındı
Url-5. (2022). *UCL Space Syntax*. 10 01, 2022 tarihinde https://www.spacesyntax.online/overview-2/ adresinden alındı
Url-6. (2022). *Weather Spark*. 10 11, 2022 tarihinde https://tr.weatherspark.com adresinden alındı

Ünver, H. (2016). *Kentsel morfolojinin geleneksel bir sokak dokusunu şekillendirmesi.* Düzce Üniversitesi Bilim ve Teknoloji Dergisi(4), 127-143.
Weinberg, A. S. (2000). Urban *recycling and the search for sustainable community development. In urban recycling and the search for sustainable community development*. Princeton University Press.
Whitehand, J. (2007). *Conzenian urban morphology and the urban landscapes.* Sixth Space Syntax Symposium Proceedings., Istanbul Technical Universitiy, Istanbul.
Yazar, E. (2019). *Kent deneyimi bağlamında farklılaşma ve ayrışma.* Yüksek Lisans Tezi, Maltepe Üniversitesi, Sosyal Bilimler Enstitüsü.
Yerliyurt, B., & Aysu, M. E. (2008). *Kentsel kıyı alanlarında yer alan sanayi bölgelerinde dönüşüm potansiyelinin değerlendirilmesi; Haliç-Tersaneler Bölgesi.* Megaron (YTÜ Mimarlık :Fakültesi, E-Dergi), 3(2), 194-205.
Yüksel, Ç. Y., & Çerçi, S. (2019). *Sıcak nemli iklim bölgesinde geleneksel konutların sürdürülebilirliğinin değerlendirilmesi.* Ereğli International Science and Academic Congress/Editor's Note, 130-139.
Zahoor, A. (1997). *Effect of trees in ameliorating air temperature in urban*. PhD Thesis. College of Graduate Studies, University of Idaho.
Zeren, L. (1978). *Günes Enerjisi ve Çevre Dizaynı Ulusal Sempozyumu: 12-14 Eylül.* İstanbul: İstanbul Teknik Üniversitesi Mimarlık Bölümü.

REHABILITATION HISTORY OF AN ANTIQUE WATERCOURSE, CİLİMBOZ STREAM, IMPACTING URBAN DEVELOPMENT IN BURSA

SERMİN ÇAKICI ALP

Sermin Çakıcı Alp, Assist. Prof. Dr., Faculty of Architecture, Hacettepe University, Ankara

ABSTRACT

This study aims to define the rehabilitation history of the historic urban landscape around the *Cilimboz* stream, a still active antique watercourse while evaluating the reasons and results of environmental regulation projects applied in the urban planning of Bursa, the first capital of the Ottoman Empire. This waterway appears from the southwest side of the Citadel walls, dated to the Byzantine period, and curves towards the north side of the city. A traditional urban texture also consists of Ottoman period residential and industrial historic structures built around this Stream. It merges with one of the most important waterways of the city, named the *Nilüfer* Stream, before coming to the Bursa Plain on the north side of the city, whereas it is mainly covered to be used for urban transportation. On the other hand, with the effect of industrialization that has developed since the 1970s, it has also been adversely influenced by the unplanned settlements that emerged due to urban change and transformation activities.

In addition to the problems destroying the integrity and authenticity of both natural and architectural heritage in its surrounding urban landscape, the historical value and functional potentials of this Stream contribute to the sustainability of this traditional urban texture. The Environmental Regulation Projects that were prepared since the beginning of the 21st century have contributed to rehabilitating its river bed under the responsibilities of the Municipality and Regional Conservation Council of Bursa (RCCB). Hence, it is essential to research the rehabilitation implementations occurring in and around the Cilimboz Streambed to understand the effects on the physical change and mobility observed in its surrounding historic neighborhoods. Within the concept of this study, first of all, a brief definition of the *Cilimboz* waterway is given concerning the urban development surrounding it. Afterward, the works for the rehabilitation and restoration of the stream bed in the last fifty years are conveyed, according to the archival documents and literature information obtained as a result of the research. In this way, it is possible to reveal the values and potential of this antique watercourse for the continuity of the historic urban identity of Bursa as one of the World Heritage Sites in Turkey.

Keywords: Antique Watercourse, Urban Landscape Rehabilitation, *Cilimboz* Stream, *Bursa*

INTRODUCTION

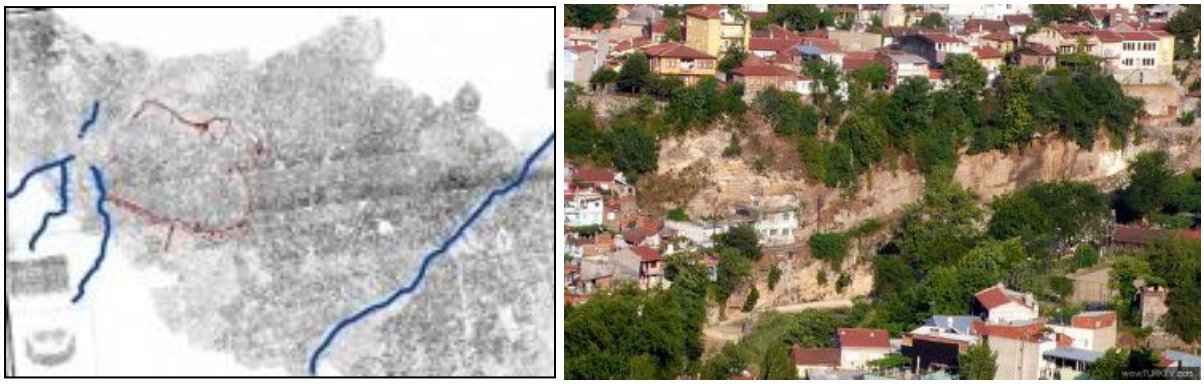
The traffic and tourism pressures, as the significant results of urban development activities, led to the pollutant loading and poor quality in urban streams while causing physical and social changes in the traditional texture of historic city cores. The rehabilitation-related urban streams are among the actions targeted by many local and national governments. However, the issue of ecological integrity and ecosystem protection has not yet been clearly defined in urban planning studies. It is usual for these waterways to be managed as a resource for human benefit in terms of water supply, flood reduction, wastewater disposal, and minimization of diseases.

The city of Bursa, which is already approved on the list of World Heritage Sites, is very fertile regarding waterways and streams. The central spring waters originating from *Uludağ* (Great Mountain) rising in the south of the city are named; *Gökdere*, *Müftü* Water, ***Cilimboz* Stream**, *Gümüş* Water, *Umurbey, Yeğni* Water, *Akçağlayan* Water, *Devrengeç* Water, *Akpınar, Gölpınar, Kaplıkaya, Alaşar,* and *Kavak* (Kandes, 2006: 155-156). As one of them, *Cilimboz* (Phillippoz / Filiboz) Stream starts in the skirts of *Uludağ* and discharges into the *Marmara* Sea after merging into *Nilüfer* Stream while having been exploited to support agriculture and the public water supply. It stretches along the west of the Citadel walls from the Byzantine period while serving as a ditch to defend the city in history. It was transformed into an artificial channel by excavating the limestone ground to reroute the waterway of *Pınarbaşı* stream, which is known as the primary water source of the city (Özer, 2001), (Yalılı and Akal Solmaz, 2004). Its streambed also has the value of including the cultural properties from both the Byzantine and Ottoman periods, which also exemplifies the complicated structure forming the urban identity of this historic city. Since it is surrounded by the remains of both archaeological and industrial heritage, the Valley of *Cilimboz* Stream is significant to be conserved as a part of the historic urban landscape within the city core of Bursa. Accordingly, environmental regulation and rehabilitation projects exist, including new land use proposals. The interventions related to these projects, which were also approved by the Regional Conservation Council of Bursa (RCCB), need to be investigated and evaluated to explain the impacts of an urban stream on the conservation and transformation of the historic built environment in this region. Consequently, it would be possible to understand the values of the *Cilimboz* Stream in forming the urban identity of Bursa while explaining its potential to provide sustainability of the historic urban landscape settled around its landmark valley.

In this study, the urban development of the built environment around the *Cilimboz* Stream is given in detail after brief information about its historical and ecological value for Bursa. Meanwhile, the current condition of this antique watercourse and its surrounding historic built-environment is presented together with the problems and potentials discovered as a result of the site survey. Afterward, the rehabilitation works done along its Streambed, which has deteriorated due to floods and stream overgrows in different periods, are investigated and presented in detail to determine how much the surrounding traditional texture is preserved. Consequently, the reasons and results of these implementations are discussed to propose the basic principles for the sustainability of this historic urban landscape as a part of the urban heritage in Bursa.

THE STUDY AREA: CILIMBOZ STREAM AND ITS ENVIRONS

Two significant streams, *Nilüfer* and *Gökdere*, have been flowing from south to north and have geographically divided the city center of Bursa into three parts. In addition, two smaller streams, *Namazgâh* and *Karınca*, split the south-eastern parts of the city. The primary source of these waterways is known as '*Pınarbaşı* spring water,' which emerges from the slopes of *Uludağ* in the southwest of the city. According to the literature (Akkılıç, 1986; Kaplanoğlu, 1996; Özer, 2001; Kandes, 2006; Karataş, 2008), this water source is the eldest spring water being used for agricultural irrigation, although it is not easy to drink due to its content including lime. It flows from top to bottom along the street, passing from one house to another within the Citadel (*Hisar*) District. It was transported to the settlement within the Citadel through the pipeline and network for the first time by Commander Hannibal in 202 BC. It enters the house through a pipe above the door and fills a small marble pool in the garden. The water coming out of the inner garden of the house passes under the door entrance to a second pool of the same size, again with a pipe, and then flows towards a downstairs neighbor's house (Özer, 2001: 28-30).



(b)

(c)

Figure 1. (a) *Cilimboz (at west) and Gökdere (at east) Streams on the map of Bursa, dated 1862.* ***(b)*** *The silhouette of Cilimboz Stream on the slope of travertine rocks of the Citadel.* ***(c)*** *The current views of Cilimboz Stream*

This natural watercourse was transformed into an artificial channel in Byzantine times, excavating the limestone ground to reroute the *Pınarbaşı* waterway. *Cilimboz* Stream is said to have taken its name from the Roman commander Philippos, who was buried close to the stream bed. It converges with the *Nilüfer* Stream in the north and empties into the Bursa Plain, while it curves along the western slope of the Castle and proceeds along the eastern side of Stadium Street in the north (Kandes, 2006: 205) **(Figure 1a)**. However, it is hard to reach the traces of its original route due to the natural and built-up infill within the stream bed. Looking at the silhouette of the Citadel from the southwest direction of the city, a chest-shaped ridge forms an area bounded by the *Cilimboz* Stream on the lowest point of the skirts of Great Mountain **(Figure 1b)**. To the east of this stream and the west of the Castle Walls rising on the slope of the travertine rocks, a double-walled dungeon wall structure draws attention (Yılmaz, 2016: 179). The excavations carried out around this historical watercourse are inadequate to discover the artifacts from ancient times. However, a tunnel was found during the earthworks done in the form of terracing on the slopes in this region, as being hidden inside the travertine rocks, which was converted into a brick vaulted ceiling and connected the inside of the Castle to the *Cilimboz* Stream **(Figure 2).** On the other hand, it was determined that the outer shell stones used in the tower and the walls of the *Zindankapı* (Zindan Gate) section resemble the large travertines near the *Cilimboz* stream bed.

Figure 2. *The secret passage in the travertine slopes on the front of the western wall of the dungeon*

Bursa has experienced a social, dynamic, and physical change process, not with its internal dynamics but with external influences since the middle of the 19th century. As a result of the Ottoman modernization movements, a new type of industrial zone consisted of silk factories and tanneries jointly established by western or Levantine investors and Ottoman business people in different districts of the city. In addition to the map prepared by *Suphi bey* in 1862, the original Drainage Map of Bursa, designed by a French insurance company in 1909, reveals the distribution of the related factories. There existed two homogeneous factory districts, one of which was distinguished along the Cilimboz Stream, flowing from south to north, at the west outer side of the city's fortress (citadel) (Erder, 1975: 89-90). As one of the historic neighborhoods in Bursa, Muradiye District, located along the westside of Cilimboz Stream, still includes silk and leather factories established in the late Ottoman Empire **(Figure 3)**. Sericulture, which formed the basis of the industry at that time, developed with the introduction of steam engines and the construction of new factories around the Cilimboz stream. According to the travelers' notes visiting Bursa during the 1860s, the factories around this streambed were mostly filatures, handling silk-reeling operations around this antique watercourse. According to the scholars (Erder, 1975; Oral and Ahunbay, 2005; Karadeniz, 2020), they should be built close to a watercourse or residential areas for the employees, while spinning mills operating with steam and water power increased in the field of silk production. The fast-flowing water supply in this historic area is vital for spinning silk on steam-powered machines or by hand. In addition, this type of watercourse is also required to remove the wastewater immediately from the production area after each cluster of cocoons is boiled. Since most of the employees working in the factories were primarily composed of minorities at that time, there existed a Jewish community living in *Yahşibey* and *Miskinler* Neighborhoods within the factory area near the *Cilimboz* Valley from the 16th century to the 20th century. These factories have continuously helped the city gain new values and potential in developing its architectural and social structure. Hence, this region must be considered a historic urban landscape with natural and artificial cultural properties.

Various historical buildings were also built within the Cilimboz Stream's environs, to be used for residential and commercial needs in this part of the historic city core of Bursa. There is an old bridge, called Cilimboz Bridge, in the north part of this Stream**.** Moreover, a 100-volt dynamo (coal-fired steam engine) built right next to this bridge also provided the city's illumination in the late period of the Ottoman Empire. In addition, numerous mills were established and made within this streambed due to the raging flow of the Cilimboz watercourse. One mill used to be managed with water carried by the channels branching out this waterway, standing at the west of this stream (Akkuş, 2011: 149-150).

Figure 3. The historic and current views of the industrial buildings along the Cilimboz Stream

PROBLEMS WITHIN THE STUDY AREA

Following the historical background of this urban stream, it is significant to evaluate the current condition of the study area, including not only the natural heritage in its streambed but also the historic built environment standing still. In this concept, the problems that have occurred due to the unplanned public improvement activities are described in detail to understand its potential in contributing to the urban development on the west side of Bursa. Hence, the problems that appeared within the natural and built environment around the Cilimboz Stream are identified and grouped as follows;

Migration and Squattering Pressure around the Cilimboz Valley:

After the establishment of the Turkish Republic, the labor shortage emerged when the Greeks, who mostly worked in silk factories, left Bursa by the 'great population exchange.' That migration movement supplies new labor transfer from the rural settlements in and around Great Mountain to the historic city center. This resulted in the appearance of the slums that emerged for the accommodation needs of the new citizens coming with this migration wave since the 1960s **(Figure 4a)**. The first slums, which appeared around the new neighborhoods reserved for the immigrants in Bursa, tended towards the slopes of *Uludağ* due to the difficulty of control and the low cost of the land. Thus, the old factory area, which was built in connection with the sericulture sector, has provided an essential financial resource in the field of national industry. On the other hand, this slum housing on the slopes is also interrupted by the valleys around the streams originating from *Uludağ* and flowing towards the north and the high, sloping ridges surrounding them. Cilimboz Stream, which passes through *Alacahirka* and *Pınarbaşı* districts in the east, has become one of these valleys where irregular and illegal constructions are seen intensely. According to a report published in 1980 by *Hakimiyet* Newspaper, which is one of the local press groups, landslides and construction problems on the slopes between *Cilimboz* Stream and *Cekirge* District were frequently mentioned by the expropriation in *Gaziakdemir* District (Satış, 2020:94). In another new dated 1978, it was stated that the zoning plan change required for the construction of the nine-storey car park in the *Altıparmak* Street, located at the northern end of the creek, was approved by the City Council. According to the project, the passage to be built on the lower floors of the car parking area, which was planned to have 700 vehicles, could be entered via the *Cilimboz* stream and *Cekirge* street (Satış, 2020: 267).

Water Pollution in Nilüfer Streamway:

The ongoing ecological life cycle in the urban streams of Bursa is under threat due to increasing population, industrial and agricultural activities, and unplanned urbanization in recent years. According to scholars (Karaer and Küçükballı, 2006; Özer, 2001), increasing nutrient loading, heavy metal concentrations, and faecal bacteria harm the water quality. The discharge of the Bursa sewerage network, which used to be called 'black sewer' and worked with a system made with flat capstones on all four sides, was changed over time by laying pipes of various diameters and was directed to the Nilüfer Stream, which caused a change in color and odor in the stream water so that no living thing could survive. As one of the tributaries joining this Stream, Cilimboz Creek has carried the untreated domestic and industrial wastewater of its surrounding sub-basin. After the feasibility report prepared by İller Bank between 1982 and 1984, two treatment plants were proposed to be built, one in the east and one in the west. After 1993,

changes were made in the sewerage project, and it was decided to make a separate system between wastewater and rainwater. Accordingly, the wastewater in the region was started to be given to the Wastewater Treatment Facilities, while the rain waters were given directly to the Nilüfer Stream (Özer, 2001: 88-89).

(b)

Figure 4. (a) The view from the factories to the squattering area, within the Valley of Cilimboz. **(b)** The floods in and around the Cilimboz Stream

Floods in and around the Cilimboz Valley:

Since the beginning of the 1980s, an odor that disturbs the inhabitants has emerged in the Valley of Cilimboz due to the decrease in water capacity and the mixing of sewage into the stream bed. The people complained about this situation and requested the Municipality to cover the creek. However, this request was rejected, emphasizing that if the top of Cilimboz, which is considered one of the drainage channels carrying Pınarbaşı natural spring water and rainwater from the valleys to the plain, is closed, negative situations, such as flooding, may occur in the stream bed after blockages that may occur over time. However, these stream closures and sanitation activities, which are against the nature of Cilimboz, started to be implemented frequently since the local government and stakeholders aimed to create a project for the renewal of this historic neighborhood at the beginning of the 2000s. Afterward, a flood disaster appeared in October 2010 in Alacahırka District, which caused the death of one person and rained 120 kilograms per square meter. As a result of an investigation around the Cilimboz Stream, it was discovered that it was not sufficiently rehabilitated and overflowed due to the accumulated garbage. Many buildings in the study area, which was also declared as a part of urban and archaeological sites in Bursa, were hardly damaged by the flooding of the Cilimboz Stream. **(Figure 4b)**

REHABILITATION AND ENVIRONMENTAL REGULATIONS WITHIN THE STUDY AREA

The initial improvement activities, such as "drying, irrigation, flooding, protection, water supply, and energy generation" of the streams in Bursa, coincided with the period of Mahmut Celalettin Pasha, who was appointed as the Governor of Bursa in 1889. To protect the Bursa plain from floods and to dry the swamps in the plain, the Italian engineer Ravotti was commissioned for producing a project in 1891. That project was revised in 1912 by the Chief Engineer of Water Works Rüştü Bey, who proposed to construct the Sarıkaya Dam to monitor the possible floods along the Nilüfer Stream. Water and sewerage network expansion implementations in the city center of Bursa continued during the reign of IInd Murat. As one of them, water access to monasteries and neighborhoods without water has become more accessible, by expanding the Pınarbaşı water network and bringing Alaşar water from Molla Fenari to Demirtaş Districts. Those arrangements were used until 1957, when the water was transferred to the peak pipe after a modern facility was built (Özer, 2001: 14). Meanwhile, Pınarbaşı spring and its surrounding water sources were covered for the first time in 1937. Afterward, the top of the Cilimboz stream, which winds

through Alacahirka and Pınarbaşı Neighbourhoods in the north and goes towards the plain in the north of the city, was partially covered with an asphalt road in the late 1950s to be used for vehicle transportation. At the beginning of the 20th century, it was observed that new units were established within the body of Bursa Municipality, which would be held responsible for controlling and improving the primary water resources flowing from the south to the north of the city. In 1917, a special commission was established under the name of “Su İdare-i Umumiyesi" by the control of the Water Administration to ensure that spring waters such as Pınarbaşı, Kavak, Akçağlayan, and Devrengeç are collected and transferred to the city center. After the proclamation of the Turkish Republic, instructions were given about the division, organization, and duties of the water administrations, in the decision of the Council of Ministers dated 22.07.1925. Thus, Turkish Republic Water Engineers were also established to be responsible for these processes. In the case of Bursa, rough water resources were given to Bursa Municipality in 1926, and a Water Administration Chief was established within the municipality.

There is a gap in such kinds of regulations on stream rehabilitation from the 1930s till the 1990s. So much so that an action plan showing the boundaries of the historical city center of Bursa was prepared and approved in a conservation decision taken by the High Board of Real Estate, Antiquities and Monuments (GEEAYK) in 1979. In this plan, the boundaries of the historic urban areas to be protected are shown under the names of 'historical urban site,’ 'historical urban site protection zone,’ 'natural site protection zone,’ and 'natural site area'. However, only Muradiye Neighborhood and Hisar districts were mentioned to be conserved initially. The streambed of Cilimboz was rehabilitated in the meantime, by the State Water Supply Administration in Bursa **(Figure 5)**. In contrast, there has been no project on rehabilitating the landscape within the Valley of Cilimboz and its immediate surroundings. In the following Conservation Council’s decisions dated 1997, it is observed that the plan revision works were focused on the Conservation Development Plans prepared for Çekirge and Muradiye Districts. Those revisions were prepared by the General Directorate of State Hydraulic Works and approved by the Council. Accordingly, it was entailed that the service road stretching alongside Cilimboz Stream should be 5 m. width, and the new buildings should be constructed 2 m above the maximum water level.

Following the flood disaster in the early 2000s, most of the multi-storey buildings built along the stream bed were expropriated by the Municipality and demolished. **(Figure 6)** On the other hand, there was neither information on how many demolished buildings were registered nor on what types of documentation and damage assessment works were held on these buildings. Nevertheless, with the removal of the buildings on both sides of the Stream, the improper housing in the traditional texture of *Alacahırka* and *Pınarbaşı* Neighborhoods disappeared. Following the expropriation and demolition of the zoning parcels (45 parcels), an area of 7700 square meters on both sides of the stream was rehabilitated and turned into a recreation area. This resulted in the proposal of a landscape design project at the bottom of the streaming road, finalized in 2014 under the name of ‘**Alacahırka Park**’. This project includes green areas, children's playgrounds, and sports fields as a recreation area within the Valley of Cilimboz. However, there was not any risk management plan for the possible cases of flood in the future, in addition to the pollution threat due to the vehicular traffic on both sides of the Cilimboz Stream.

(a) *(b)*

Figure 5. (a) *Rehabilitation of Cilimboz Streambed, in 1964.* ***(b)*** *The rehabilitation work within the Cilimboz Streambed, in the 1990s.*

Figure 6*. The expropriation and demolishment of the buildings constructed along the Cilimboz Valley*

Revisions in the Muradiye District Conservation Development Plan, dated 2003, consider the cadastral changes caused by road opening and expansion works within Hisar District. Accordingly, the related area was revised by overlapping the natural sites' borders, including the Cilimboz Stream and its surrounding in the southwestern part of Hisariçi and the slopes in the northeast of Tophane Hill. The plan revision proposal for estimating the flood line of Cilimboz Stream, which was also located inside the borders of the Muradiye District Conservation Development Plan, was approved in principle. In the meantime, another decision concerning the revision of Muradiye CDP focused on parcellation and functional distribution in natural and urban historic sites within the related neighborhood. Afterward, it was proposed to use defined building lots in the surrounding Cilimboz Stream as 'sports facilities' and 'playground areas' in 2004. The four project areas were determined to rehabilitate the natural and built cultural heritage alongside the Cilimboz Stream.

Cilimboz Stream and its Vicinity Design Areas (Alacahırka Sports and Recreation Area)
Altıparmak-Muradiye Working Area (Yeşil Valley Arrangement Area)
Landscape Arrangement Area between Merinos and Stadium Semi-Open Transitions

LANDSCAPE ARRANGEMENT AREA ALONG THE BASIN OF CILIMBOZ STREAM

Meanwhile, the Bureau, which was founded for the Conservation of the Historic Environment within the Great Municipality of Bursa, produced a report, including photographs and sketches describing the current condition of the Cilimboz Valley, to share it with the Conservation Council of Bursa within the scope of **Cilimboz Valley Urban Design Projects** (**Figure 7**). These projects were titled in relation to the previously defined project areas, such as;

'Muradiye Cultural Area Project-Factory Restoration and Reuse Applications';
'Cilimboz Stream Rehabilitation and Green Area Project';
'Alacahırka Sports-Recreation and Green Area Project.'

As one of them, the principles of **'Muradiye Cultural Area Project'** focused on the reuse of the social complexes (külliye) that are qualified as industrial heritage factory buildings dating back to the end of the 19th century- beginning of the 20th century with culture-tourism-recreation purposes so that it would join the social installations of the city. Fabrika-i Hümayun buildings and Romangal (Yılmazipek) Silk Factory buildings were restored together and used for educational and cultural purposes. This would provide ***the arrangement and conservation of the open public spaces and the historic structures around the project area between the Alacahırka Quarter on the north and the Merinos Intersection on the south***. It proposes rehabilitating the whole Streambed of Cilimboz while aiming for restoration and continuity of the industrial buildings alongside the river. On the other hand, there is no extensive archaeological report for the artificials, despite certain cleaning and renovation works being held in the floodplain.

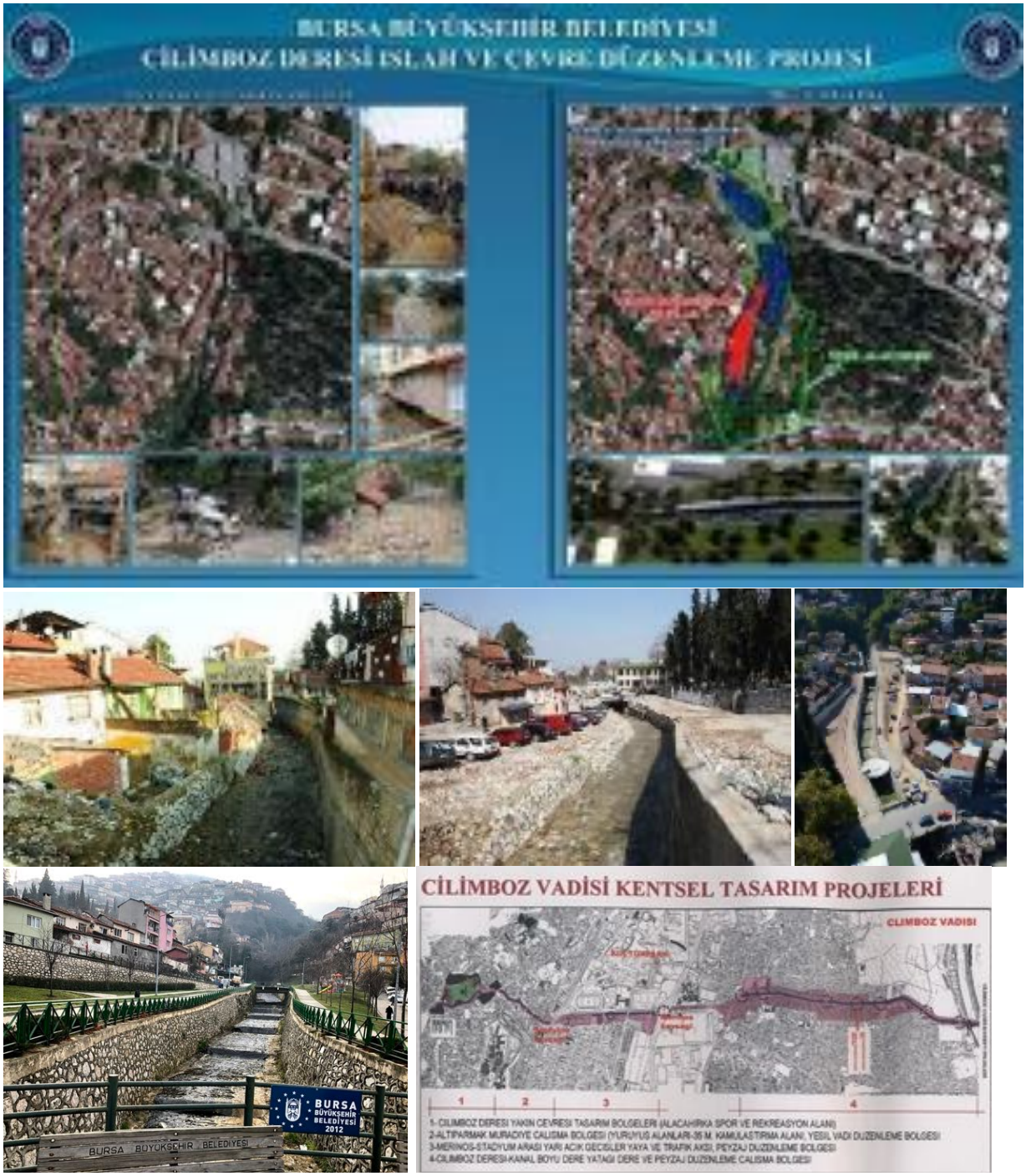


Figure 7: *Implementation of Rehabilitation of Cilimboz Stream (Ancient Watering Channel) and its Surrounding Environmental Regulation Project (2010-2014) (the archive of the Municipality)*

Among these projects, the Conservation Council approved the revisions related to the 'Cilimboz Valley Rehabilitation Works' and 'Alacahırka Sports and Recreation Area Land Use Project.' In these projects, a plan revision was proposed to avoid the destruction of the bridges, the fountain, and the trees within the stream bed of Cilimboz. In another site survey and rehabilitation work prepared by the Municipality of Osmangazi, the suggestion of two channels conjoining with the Cilimboz Stream was approved.
Since the building lots, which had the General Directorate of Pious Foundations and those owned privately, were not filled in according to the new building principles of the Muradiye District Conservation Development Plan, another revision was required in 2005 for designing a green area. In connection with this decision, the demand for housing intended to be built in a place on the east side of Cilimboz Stream was rejected by the Conservation Council since it was previously defined as a green area in this plan.

According to the information gathered from the activity reports of the Metropolitan Municipality of Bursa, the urban design projects, which were prepared at the beginning of the 21st century, were prepared to reuse the defined empty areas as a public square and green recreation area, for rehabilitation of landscape and townscape. One of them is the **Cilimboz Stream Landscape Design Project,** which started in 2003 and became an important matter of discussion in the agenda of the Regional Conservation Council and the Metropolitan Municipality of Bursa after the flood in 2010. This project was prepared for ***the renovation and rehabilitation of the area between Cilimboz Stream and Fabrika-i Humayun (Imperial Factory)*** to the west of the Site while proposing to open the top of the streambed, which had been covered with concrete or asphalt material previously**.**
Within the scope of the Muradiye District Conservation Development Plan, rehabilitation and plan revision works were done to regulate the uncut flow of the Cilimboz Stream in case of a flood. However, these implementations were requested to be partially realized in the project area. Afterward, a decision was approved in 2012 about the preparation of another **"Cilimboz Stream Landscape Project "** for the floodplain of the stream. In another approval by the Regional Conservation Council, it was decided to consolidate the city walls instead of the reconstruction as a part of archaeological remains in and around the Hisar and Tophane Districts. However, the reconstructions started to be applied along the north and west side of the Citadel walls. At the same time, the expropriations were completed by order of the Great Municipality of Bursa. Accordingly, the city walls between Bey Palace and Yer Gate at the north together with Zindan Gate and Yer Gate at the south were completed by using both old and new construction materials, according to the restoration project drawings prepared based on measured drawings and restitution plans. However, this application has caused the loss of authenticity as a fake monument due to the use of incompatible materials and technics to perceive the city walls as a whole. In the following Council's decision approved in 2007, the infrastructure work considering ***the renewal of the fresh / drinking water pipeline in Yokuş Street and Kavaklı Street, located in the east of the 1st Degree Archaeological Site within the borders of Muradiye District Conservation Development Plan.*** That drilling work was only allowed with the opinions of professional excavation presidents with the supervision of the Municipality and Museum Directorate according to resolution no: 658.

CONCLUSION

Early civilization and daylighting implementations are defined as a part of the urban stream development, together with initial settlement down by the riverside and channel applications aiming to solve the carrying capacity issue of the streambed (Maksimović (2005: 192-193). The monitoring of an urban stream is used to prevent or reduce bank erosion, flooding and increased pollutant loads. Still, it may also be used for the protection of natural hydraulic conditions and urban aquatic habitats. Maksimović (2005) presents the URBEM project, which aims to investigate various aspects of new techniques and materials for bringing files back to urban streams, in order to provide long-term sustainable solutions for interactions between the river corridor and its surrounding urban environment. Accordingly, a Training Module is designed in order to develop the capabilities of public, professional, and environmental authorities about how to apply and maintain an urban rehabilitation scheme for historic cities across Europe.
According to the conservation decisions taken by BKTVKBK since the beginning of the 2000s, there have been periodical arrangement applications along Cilimboz, as an antique urban stream. However, the rehabilitation works on the development of watercourses, like the Cilimboz Stream, have focused on shifting from natural riverbeds to confined narrow river corridors with channels canalized in concrete and other artificial materials forming both the bed and banks of the waterways. Besides, the pollutant loading also frequently leads to poor water quality, which threatens public health due to the increase of the bacteriological or chemical quality of urban streams. There are also illegal new buildings constructed along these three rivers' stream bed since they have not been designated as natural sites, yet. Moreover, the new building constructions and new additions on the façade of traditional houses along Gökdere stream bed were not forbidden either. Hence, certain revisions, concerning new building constructions within the stream bed of Cilimboz, should be prepared in the planning decisions of Muradiye CDP. Consequently, an inconsistency is observed between the in situ conservation approach proposed for archaeological material and the conservation of overground cultural properties. Besides, the attitude of producing fake historic spaces, far from keeping the perceptional integrity and authenticity of the place, by means of demolishment and reconstruction of the traditional houses instead of conserving and reusing them with their original features and materials, was embraced, in addition to the inconsistencies between the old and new in the completion implementations.

REFERENCES

Akkılıç, Y. (1986). *Bursa Tarihi – 1 – (Başlangıcından 30 Ekim 1918'e)*. Bursa Hakimiyet Yayınları, Bursa.
Akkuş, M. (2011). Industrial Regions of Bursa According to the City's Drainage Map of 1909. *Uludağ Üniversitesi Fen-Edebiyat Fakültesi Sosyal Bilimler Dergisi*, 12(21), 2011/2, 147-155.
Erder, L. (1975). Factory Districts in Bursa During the 1860's. *METU Journal of the Faculty of Architecture*, 1(1), Spring 1975.
Kandes, V. I. (2006). *Bursa: Antik Döneme Ait Yazıtlar - Topografik Harita ve Bazı Yapılara Ait Fotoğraflarla Birlikte Kentin Arkeoloji, Tarih, Coğrafya ve Din Yönlerinden Tanıtımı*. çev. Dr. İbrahim Kelağa Ahmet, haz. Selahattin O. Tansel, orjinal baskı: Atina-1883, Ankara.
Kaplanoğlu, R. (1996). *Yer Adları Ansiklopedisi.* no:2, İstanbul: Bursa Ticaret Borsası Kültür Yayınları.
Karadeniz, D. (2020). *Endüstri Mirası Yapıların Korunması ve Kente Entegrasyonu, Bursa Örneği*. [unpublished Master Thesis], Dokuz Eylül University, İzmir.
Karaer, F., & Küçükballı, A. (2006). Monitoring of Water Quality and Assessment of Organic Pollution Load in the Nilüfer Stream, Turkey. *Environmental Monitoring and Assessment,* 114, DOI: 10.1007/s10661-006-5029-y, 391–417.
Karataş, A. İ. (2008). Bursa Suları ve Su Vakıfları. *Uludağ Üniversitesi İlahiyat Fakültesi Dergisi,* 17(2), 379-417.

Maksimović, C. (2005). Urban Stream Rehabilitation - Lessons (to be) Learned from URBEM Project. *Water Engineering Research*, Vol. 6, No. 4, 189-195.
Oral, E. Ö., & Ahunbay, Z. (2005). Bursa'nın İpekçilikle İlgili Endüstri Mirasının Korunması, *İTÜ Dergisi / a, Mimarlık, Planlama, Tasarım*, 4(2), 37-46.
Özer, A. S. (2001). *Pınarbaşı'ndan Doğancı'ya Bursa'nın Soğuk Su Tarihi*. ISBN 975-95 498-2-4, Bursa: BUSKİ Yayınları 2.
Satış, İ. (2020). *1950-1990 Yılları Arasında Bursa'daki Mimarlık ve Planlama Faaliyetlerinin Yerel Basın Haberleri Üzerinden Değerlendirilmesi*. [unpublished Master Thesis], Uludağ University, Bursa.
Yalılı, M., Akal Solmaz, S. K. (2004). Su Temini Tesislerinin Tarihsel Gelişimi Sürecinde Bursa İli, (Historical Development Process of Water Supply Systems in Bursa). *Uludağ Üniversitesi Mühendislik-Mimarlık Fakültesi Dergisi*, 9(1), 171-181.
Yılmaz, İ. (2016). Şehir Sur Zindanları Kapsamında Bursa Zindanının Tespiti Belgelenmesi ve Restitüsyonu. *Uludağ Üniversitesi Fen- Edebiyat Fakültesi Sosyal Bilimler Dergisi***,** 20(31), 2016/2, 173-194.

‘KENT VE DEMİRYOLU’ BLOG AS A REALM OF INFORMAL PLACEMAKING

BAŞAK ÖZDEN

ABSTRACT

The digital realms emerged in the 21th century set an autonomous opposition to the centralized practices of spatial production. An example of these, the blog named 'city and railway' was established in 2007 as an open-source participatory platform by a group of railway workers in response to the destruction practices against the railways in Turkey. This study will inspect the major tangible-intangible destructions that have taken place since the 1990s through this blog, while considering it as an informal placemaking realm in which the railway landscape is reproduced and represented in its rich cultural context. Since its construction in the late Ottoman period, the railway landscape produced a deep-rooted collective memory and cultural heritage within a fluid experience based on an urban and travel culture. Following the establishment of Turkish Republic, this landscape has also become the wholistic spatial framework of collective memory of the railroaders, a modern community of the nation built around a professional organization. A rich, particular spatial reservoir in the railways served for work, accommodation, health, recreation, entertainment and family life of the workers. Marking these two different but interconnected contexts, this study will address the blog as a medium of social activism and spatial identity/memory representation. Finally, the study will propose current autonomous practices could inspire new approaches, methods and tools in re-shaping urban space.
Keywords: blog; cultural landscape; destruction; informal placemaking; railway; spatial memory