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Theory and Research in Architecture, Planning and Design

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CONTENTS

Chapter 1

STORAGE FURNITURE FROM TRADITIONAL TO THE CONTEMPORARY IN TURKISH HOUSE

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1.INTRODUCTION

The act of storing in the house has come from the days when people need shelter without losing its value. Throughout that long period, numerous technical, economic, and socio-cultural differences have been included in the storage act. The first inhabitants used the recessed areas of the caves in ancient times for storage purposes, and over time they conducted the storage role with instruments including blocks, buckets, wooden crates, leather bags, etc. To combat a pest infestation, mostly large airy spaces were used in the first civilizations to store cereals such as corn, wheat, and barley. In the excavations at Skara Brae settlement, stone racks and storage cells were identified as an example of storage elements in the first settlements. The interior of the sitting cedar was used for storage purposes at Çatalhöyük, one of the settlements of the Neolithic Period, and shelves were installed in the buildings. Their dead were also covered in cedars (Fig.1).

Figure 1. Skara Brae BC 2000s, Storage Unit Made of Stone and Storage in Çatalhöyük House (URL-1, URL-2).

In ancient Greece, Egypt, and Mesopotamia, chests, boxes, and bags were used extensively for the storage needs of the people. An image in the Bible (Codex Amiatinus) in A.D.700 shows the storage item, identical to the cabinet with the form of today's handle (Fenlon, 1908) (Fig.2). The "armoire" was introduced in France in the 1500s to be used as a wardrobe. A wide variety of storage items have been used in history in various societies across different periods (Fig.2). Turkish culture is one of these cultures.

Figure 2. An Image in The Bible (Codex Amiatinus) in A.D.700 Shows the Storage Item (URL-3) and An Armoire from the Baroque Period (URL-4).

2. STORAGE FURNITURE IN TRADITIONAL TURKISH HOUSE

The place of storage activity in Turkish culture has emerged in the Turkish immigrant tent (Black tent/ Karacadır and Yurt) as indoor and outdoor areas. In the traditional Turkish house, which is created by the construction of the Turkish tent and which constitutes the traditional residential architecture, the storage function of items not needed for daily use; on the ground floor of the building, it was solved in spaces such as warehouse, cellar, haystack and specially built spaces such as serander in the garden (Demirarslan, 2017, 987) (Fig.3-4).

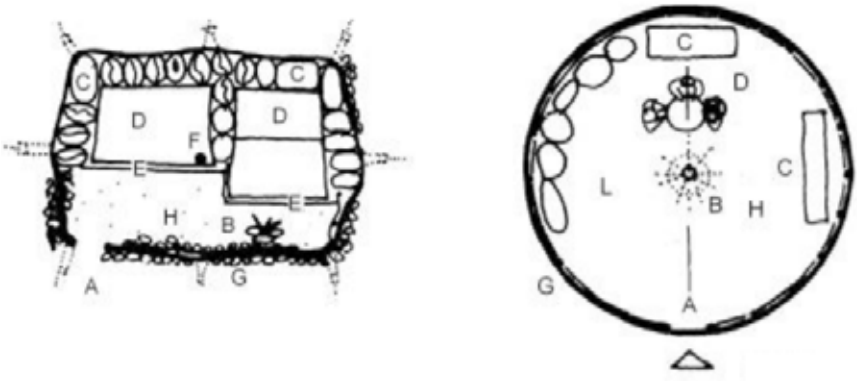

Figure 3. Planning Scheme and Place Usage of Black Tent/ Karaçadır And Yurt. A: Entrance, B: Hearth, C: Storage Sacks, D: Felt laid sitting area, E: Matting Floor, F: Beams, G: Stone Wall, H: Daily activity are on soil floor, K: Common usage area between tents (Demirarslan, 2017, 987).

Figure 4. Grain Storage Warehouse, Serander (URL-5).

The cabinets in each room were serving the storage needs of the everyday goods in the house. The use of stationary objects in the house is very limited because of the multipurpose use of the rooms as living units. When required, the items were brought to the place of use and removed after use. The cabinets, first used by the Ancient Romans in the World (Demirarslan, 2011, 298) and not used as individual furniture in the traditional Turkish house; it appears as a spatial feature formed by the building and affects the house layout.

Storage elements, one of the most important elements of the traditional Turkish house, were treated in both plan and third dimension with a rather practical understanding. As mentioned in "Turkish House" of Sedad Hakkı Eldem (1984) and "Turkish House Tradition and Safranbolu Houses" of Reha Günay (1999), the storage element plays an important role in the arrangement of the room, which is the most important structure of the traditional Turkish house. The cabinet element, which was a factor in making planning decisions, was treated with various solutions. The room designs were realized with the study such as the relationship between the cooker-cabinet, the relationship between the cabinet-door, the relationship between the cabinet-window, and the placement of the cabinets back and forth in the rooms (Kuloğlu et al., 1995, 310).

The most significant aspect of the cabinets in the third dimension of a typical Turkish house is that they are at the height at which the hand can touch. This relationship is explained in the books of Eldem and Günay through Le Corbusier's "Modulor" proportion system, and similar aspects are emphasized. Depending on the height of the ceiling the third dimension of the cabinet is evaluated in various ways. Depending on the properties of the stored items and the regions, the storage elements are named as "yüklük/ closet/ wardrobe, musandıra, sergen/ shelf, çiçeklik/ flower bed,

cubukluk/bar shelf, kavukluk/turbans shelf, testilik/ vase shelf, lambalık/ lamp shelf and tembel deliği/ lazy hole". Some cabinets meet the function of washing. The washing action in the room was ensured by the so-called "gusulhane/ washing unit" in the wardrobe (Fig.5). At this point, the storage elements which have an important position in the traditional Turkish residence room need to be recognized briefly.

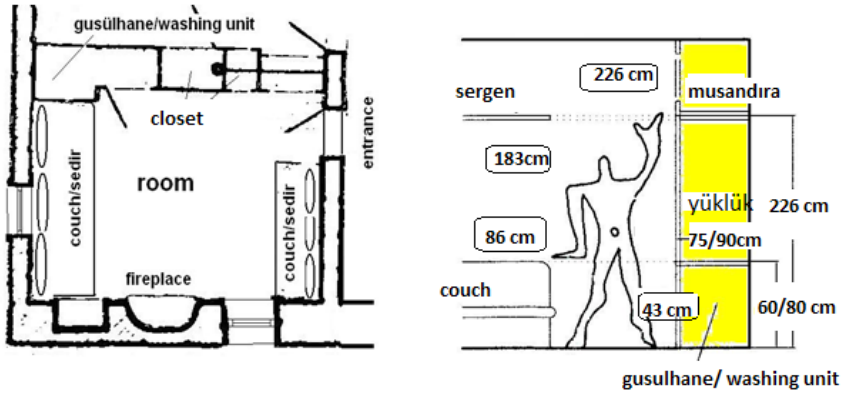

Figure 5. Storage Elements and Room Design, Storage Element and Proportion System in Traditional Turkish House (Günay, 1999,140).

"Yüklük" (closet or wardrobe) was a large cupboard in which the necessary items for sleeping action such as bedding, duvets, and pillows were stored during the day (Fig.5). As mentioned in the book "The City of the Sultan and the Traditions of the Turks in Family Life" published by the famous traveler Julia Pardoe in 1837, thanks to this storage unit in every room in the traditional Turkish house, nothing belonging to the bed was left in the morning (Evren, 1997, 24). These cabinets are formed in a suitable depth and width (depth 75-90 cm x width 130-150 cm), which can be ergonomically determined by folding the cotton or fleece beds, each weighing 10-12 kg, and taken from the ground (at a height of 60-80 cm from the ground) so that the mattress can be easily raised and mounted. It is observed that in some houses the double-door hitches, which are usually combined with the technique of wood incorporation into the frame system, were mostly made without cover. They were also situated at the room 's entrance or on the wall where the stove was. Some wooden cabinet doors have carving technique decorations (Sayan & Öztürk, 2001, 34). Beginning in the 14th century, in the technique of Edirnekari (Edirne furniture), decorations were made on the wooden material in crates and shelves as well as on the lids (Fig.6).

Figure 6. A "Yüklük" Made Using Edirnekari Craftsmanship, Edirne Museum.

Figure 7. Musandıra- Yüklük/ Closet and Room Entrance, Antalya.

Figure 8. A "Çiçeklik" (Flower Bed)- Uşak and A Bookcase – Bitlis (Sayan& Öztürk, 2001).

Figure 9. Niches Named as Tembel Deliği/ Lazy Hole, Safranbolu.

Apart from the cabinets where beds and quilts were stored, the width and depth of the cabinets where small items were stored can also be double or single doors. Packs, sewing-embroidery materials, and items such as prayers, jugs, cups were stored in cabinets that begin at a certain height from the ground, such as the "yüklük". The cabinets extend to the shelves at the height of the window and door surrounding the space, named "sergen". The "sergen"s' width is 12-15 cm and they have been used for ornamental

purposes and for placing items that are of no use (Günay,1999, 239). For certain dwellings, the open portion of the room cabinets above the sergen stage was used up to the ceiling for storage and was called "musandıra". There was a railing in front of the "musandıra"s, which allows regular positioning of the items (Fig.7). Besides these, on the walls of the room, there were tiny eyes and recesses with names like "carving," "flower bed". These niches were usually made for putting ornaments. Packed and unpacked clothing pieces, and the only storage elements of various weavings, jewellery, and valuables, and perhaps most importantly, young girls' handcrafted dowry, are still chests that have come almost unchanged since the nomadic life of the Turks (Farouqhi, 2002, 177) (Fig.8-9). Cypress or walnut tree is often used in the construction of chests, which are typically placed near the door in the rooms since it does not contain moth.

On the other hand, as mentioned above, in the traditional Turkish house, the rooms with a stove were considered as "gusulhane". The "gusulhane" doors have the same characteristic as the cabinet named "yüklük." As can be seen in Safranbolu and Avanos houses, it is possible to come across bathing areas, which have become "gusulhane" by removing the wooden shelf in the "yüklük" (Sayan&Öztürk,2001,144) (Fig.10-11) In the big mansions, there is another space element that is used as a closet but for service rather than storage. These space elements were installed between the harem apartments and the selamlik parts of the large mansions, called the "rotating cupboards." Women are equipped with items like milk, coffee, syrup, products without revealing themselves to men, thanks to those cabinets. When the cabinet was turned by hand, the bottles, cups, glasses, and plates placed on the shelves of this cabinet were easily transmitted to another place. That design is significant in terms of being an interesting proof of how planning in traditional Turkish housing affects the concept of privacy (Fig.11-12).

Figure 10. Gusulhane in Safranbolu Houses.

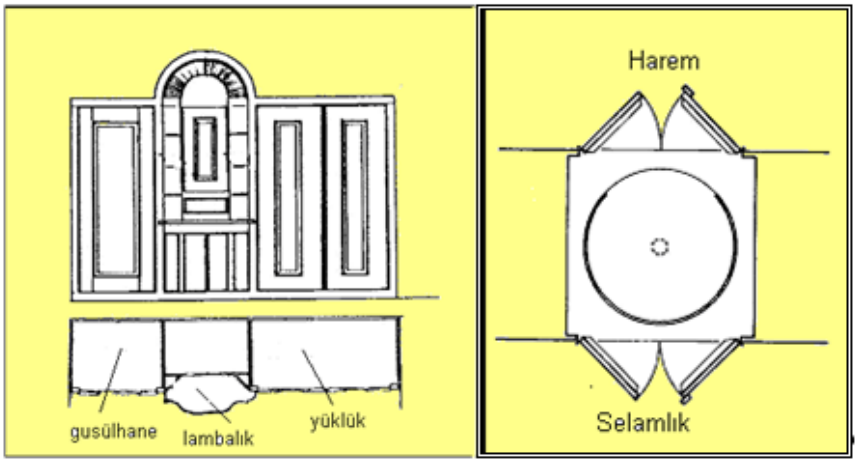

Figure 11. "Gusulhane", "Yüklük" and Rotating Cupboards in Traditional Turkish House. (Aksulu, 2001,149; Günay, 1999,105).

Figure 12. Rotating Cupboards in Safranbolu Houses.

3. STORAGE IN HOUSES TODAY

The need for storage in typical Turkish life, as can be observed, is a significant element that influences the space design and requires multiple roles apart from storage. Following the Tanzimat Edict, the storage role in traditional residences began to be solved with space-independent Western-style furniture within the context of the Westernization movements which began to be encountered in the Ottoman society. In this way, in addition

to the cabinets named “yüklük”, storage units with drawers and lids called “console” and “wardrobe” have taken place in the rooms and sofas. Rapid industrialization and population development, migration from village to city have caused lifestyle and daily use changes over time, and since the 1950s the housing shortage created by these changes has been attempted to be solved with apartment-type buildings. On the one hand, the design of the traditional Turkish house, which had trouble meeting the requirements of modern life with the transition to apartment-type living, was disrupted, and on the other hand, the storage needs of those citizens who are still trying to fulfill the requirements of a more traditional existence were also neglected. It is seen that the units in multi-storey city dwellings are moved to the second plan, which is stored as food and clothing such as cellars and cabinets named “yüklük”. However, in our rapidly modernizing society, the use of goods is on the contrary rather than declining. As a result, balconies, toilet areas, corridors, small rooms in today ‘s house are a storage space within the residence, and cannot be used according to their functions.

Figure 13. Storage Furniture Changing with Westernization (Sayan, 2001).

According to data from 2019, furniture exports to 179 countries engaged in Turkey, users are forced to look for alternatives for this purpose. Furniture designers and manufacturers are trying to bring solutions to the storage problem with modular furniture production by giving priority to the storage action in multifunctional furniture designs in response to this rapidly developing need (URL-6) (Fig.13). Besides these modular and multifunctional furniture such as sofa beds, chests, chest beds, working tables with drawers, cupboards, chest dining tables, which can also be used for storage purposes, cabinet accessories, which include the interior layout of the storage items, have gained significance and have acquired special functions. It is possible to store many items in tiny cabinets thanks

to these accessories such as hinges, hangers, rails, shelves, handles which add usability, prestige appearance, and privilege to furniture. Therefore, as in traditional residences, storage units are not for general storage purposes; they are built according to the quantity and nature of the goods to be stored. With the development of artificial wood materials and shaping methods in Turkey, modular storage furniture is exported to countries including Iran, Azerbaijan, the Russian Federation, Kazakhstan, Uzbekistan, Turkmenistan, Israel, and EU countries and meets people's needs.

Figure 14. A Contemporary Garment Storage Unit.

4. CONCLUSION

The need for more flexible and functional use of spaces that are shrinking as a result of the conceptual changes in the housing sector keeps the demand for storage furniture alive. With the development of a modular storage element design, the storage elements have become space-independent. With the development of the design of the modular storage element, the storage elements have become space-independent. It has also been transformed into storage spaces beyond furniture and storage units that are used not only for need but also for the display of status-determining objects in rooms such as living rooms, kitchens, and bathrooms outside the rooms. The key point here is that, as a result of cultural accumulation and assessment, the perception of interior and furniture should be handled in a way that hits all of its smallest elements (Eriç et al., 1986). Consequently, to say; having storage units built according to space and need is an important trend that designers should emphasize in interior design. Especially if the room is small and you do not want a messy look ...

Digital closets are expected for potential use in bedrooms. Such interactive wardrobes obtain the data and recommend everyday clothing according to their material and the day's forecast. It has the characteristic of realizing which clothes are clean and ready to wear. With the smart mirror which virtually dresses anyone who chooses clothes to wear, decision taking becomes simple.

Figure 15. A Smart Storage Element (URL-7).

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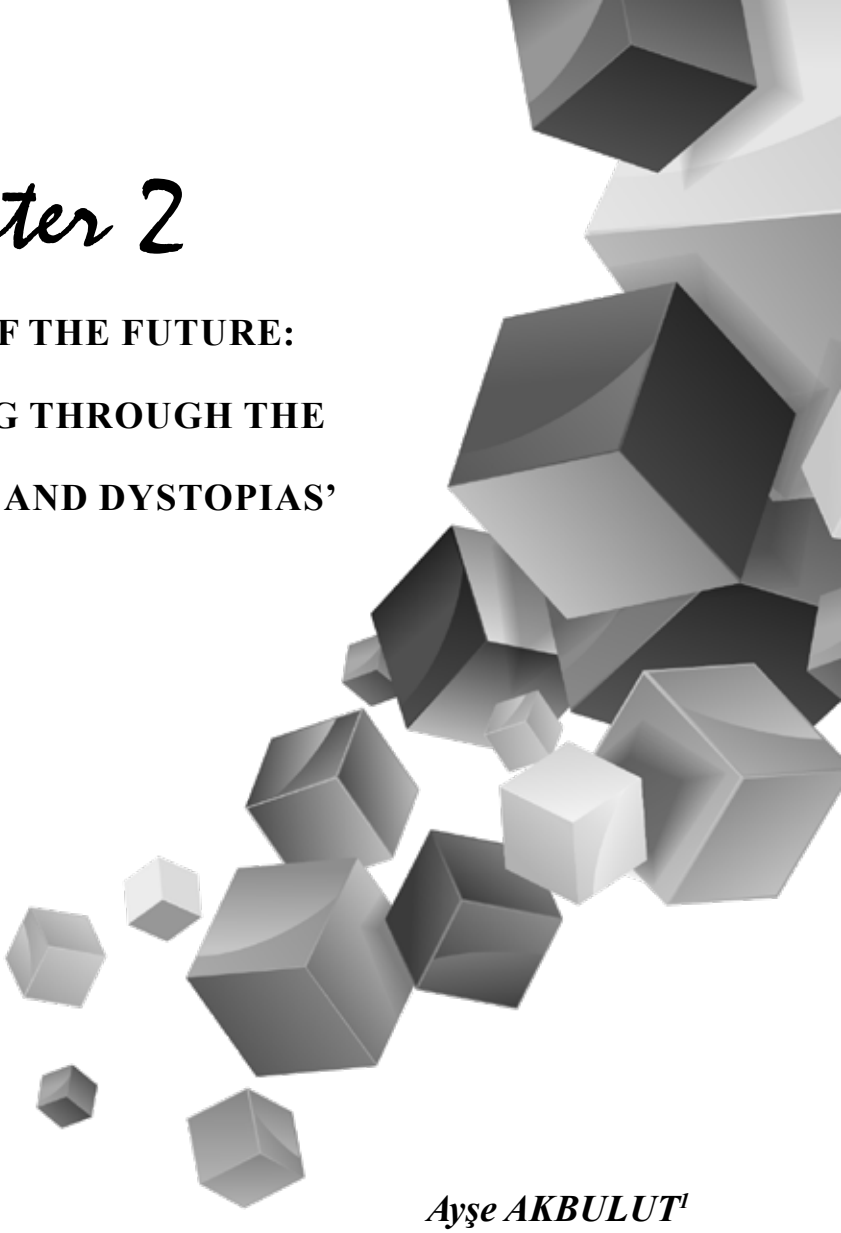
Chapter 2

CITIES OF THE FUTURE: ‘READING THROUGH THE UTOPIAS AND DYSTOPIAS’



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Planning, discussing and evaluating the cities of the future is becoming more complex day by day. Uncertainty, dynamic international or local administrative relations, acceleration of the innovative tools, and many other things contribute to this complexity. Introducing and discussing utopias and dystopias throughout history can be helpful to make it clear. From this point of view, this paper proposes to investigate the concepts and the types of utopias and dystopias and the sub-causes of these approaches in history and to imagine and describe the city models of the future predicted by academic and artistic writing.

1. Utopia and Dystopia

Utopia means the ideal form of society that does not actually exist. *Ou,* meaning 'absent' or 'non-existent' in Greek, is derived from *eu,* which means 'perfect', and *topos,* meaning 'place,' 'land' or 'country'. Its use became widespread with Thomas More's book, *De Optimo Reipublicae, deque Nova Insula Utopia*, or *Utopia* for short, written in 1516. The term 'dystopia' (anti-utopia) is mostly used to describe the anti-thesis of a utopian understanding of society. A dystopian society is characterised by an authoritarian–totalitarian state model or another similar oppressive system. 'Dys' (sometimes spelled 'dis' in modern constructions), is a Greek prefix meaning 'bad', 'sick' or 'abnormal'.

In addition to these two general concepts, there are also the concepts of 'heterotopia' suggested by Foucault and 'retrotopia' suggested by Bauman. Foucault (1997) says in his *book Of Other Spaces*, published in 1967 that heterotopia exists in the reality of every human being. According to him, heterotopia is the opposite of utopia. They are real spaces containing contradictions within themselves, question the correctness of existence, outside of all areas, marginalised, implemented and realised. He makes this definition with abstract concepts through concrete urban spaces (cemeteries, museums, libraries, holiday villages, etc.) experienced in daily life. In Bauman's more up-to-date approach, *Retrotopia* (2018), utopia is idealised in a way that people can live in prosperity and peace, as in previous examples. Retrotopia, on the other hand, is a space that overlaps past and future, contrasting with the paradoxical reality of human beings.

When utopian depictions are examined, one or more of the following aspects is included:

- A green island
- Fertile land
- Beautiful living spaces

- A society that has managed to live happily together

In the description of this ideal but non-existent place, we can see that the attribution of the desired place is made by defining the person as 'good' or 'beautiful'. Dystopic settlements, on the other hand, do not have clear, general characteristics.

2. Why Do Utopias Exist?

These spaces, where the ideals of happiness and those who cannot be happy in the order they live in have been determined, have become 'dream places' and have been effective in shaping everyday lives to be happy.

Utopias are depictions of a universally happy society. Offering the ideal of a piece of land where people can live in harmony, health and happiness, these dream venues also envisage an 'equal' lifestyle without discrimination among the people it contains. According to Davis (2005), 'the whole political philosophy deals with fiction such as 'sovereignty', 'dialectical', 'general will', 'separation of powers', 'public opinion' and 'common interest'. Just as fiction describes all political theory, it also qualifies utopia writing'. Kumar (2005) argued that utopias could be a political and increasingly perceptual and informational management tool on societies: 'the issue is clear: a utopia is actually a tool for social and political speculation rather than a literary imagination exercise for itself and for itself.' In *Places of Hope*, David Harvey (2008) states that utopias have an important place with the belief that we cannot choose the context, i.e., every product we produce within capitalism will become a commodity. According to Catherine Malabou (2006) 'What should be done to prevent consciousness from colliding with the spirit of capitalism?' By asking the question: 'Utopias can be created' answers. According to Žižek (2008): 'Utopia has two false meanings: The first is the dream of an ideal society isolated from real life, the utopia and the other are the goods that evoke the desires and pleasures imposed by capitalism. Utopias serve the continuity of the system with the perception of 'equality'. In the capitalist relational forms in which the individual is isolated, utopias create 'areas of happiness' with the ideal of the quality of life promised to those who have never been happy in their daily lives and provide a relaxation area within the system. People who can never be happy create a space for themselves in the system in line with these dreams.'

3. Types of Utopia

According to the literature review, the classification of the types of utopia has been made with two different approaches (Yale University Library, access 01.11.14). The first approach classifies types of utopias related to the historical process and the other classifies them in relation to its components.

Historical Process: Ancient, Renaissance, Industrial Age, Modern, Postmodern

Types of Components: Economic, Political and Historical, Religious, Scientific and Technological

Considering that it covers both details, in the following sections, the classification made 'according to the types of components' will be used.

3.1. Economic Utopia

This kind of utopia has an economic basis. Economic utopias were created as a solution to the difficult economic conditions of the 19th century. With the development of capitalism in the early 19th century, these utopias began to be used. They can often be grouped as socialist utopias. In the utopias produced include some common features, listed below:

-Equal distribution of goods

-Abolition of money

-Generous public common areas, green spaces

-Jobs that people love and that benefit society

-Time for learning science and making art

Edward Bellamy's novel *Looking Backward*, published in 1888 and *News from Nowhere*, published by William Morris in 1890, are examples of this type of utopia. (See Fig.1–2).

Examples:

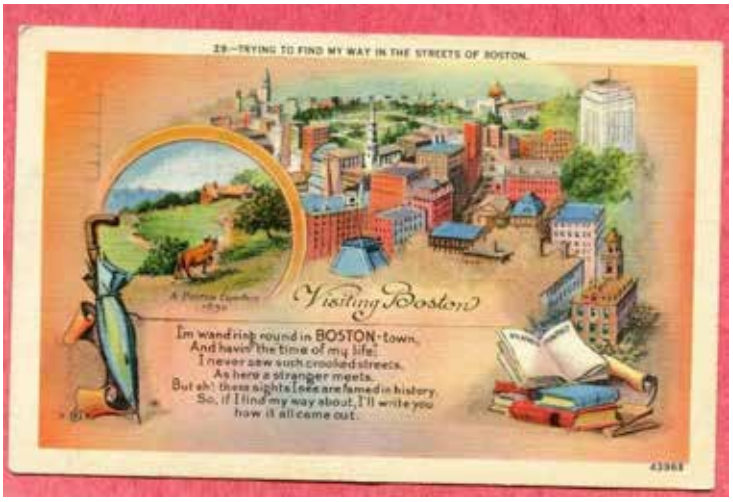

Figure 1: Illustration from Edward Bellamy's novel Looking Backward (1887)

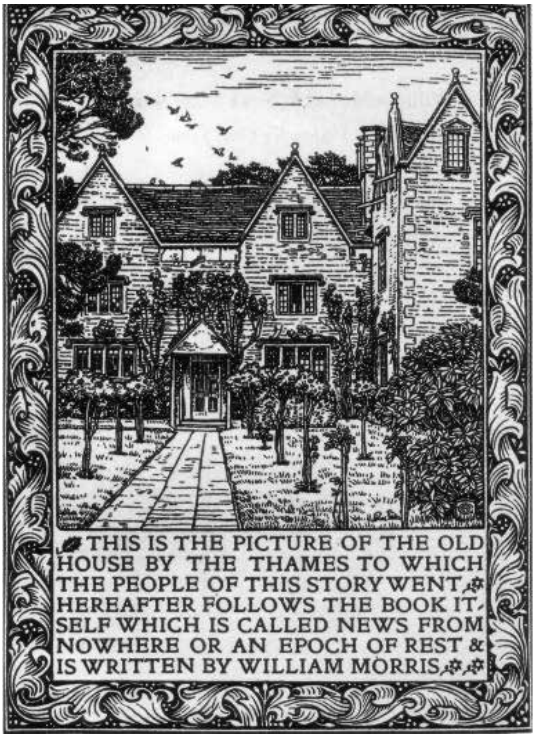

Figure 2: Illustration from William Morris's novel 'News from Nowhere', (1890)

Apart from the socialist utopias, individual and liberal utopias were developed in the later periods, especially in the early 20th century like Heinlein's *'The Moon Is A Harsh Mistress'* (See Fig. 3).

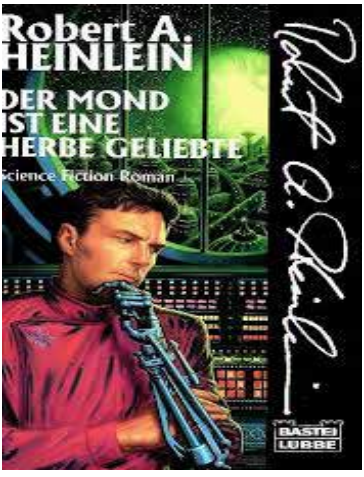

Figure 3: Illustration from Robert A. Heinlein's novel 'The Moon Is a Harsh Mistress', (1966)

There are some common features in the created, fictional worlds:

- Science-based fictional world

- Private institutions that were established without state pressure

- Developing individual initiatives

- The belief and admiration of a free-market economy that provides great success.

In the 1930s, Henry Ford created Fordlandia, a utopia in Brazil, effectively transplanting the American way of life to the middle of the Amazon Forest. A large farm intended to produce rubber was located in the urban utopia, along with facilities such as hospitals, schools, power plants (See Fig. 4). But with the exploitation of labour in the utopia, this newly started utopian city was closed after a workers' uprising. The right-hand photograph shows damage to a clock by the workers.

Example:

Figure 4: 'Fordlandia' settlement founded by Henry Ford (1932)

3.2. Political and Historical Utopia

Political utopias are utopias where the government strives to create a perfect society. The global utopia of world peace is often seen as a possible unbearable end of history (See Fig.5).

Example:

Sparta, created by Likurgus in 700 BC, is known as a militaristic utopia in the history (MacGregor, erişim tarihi 2014).

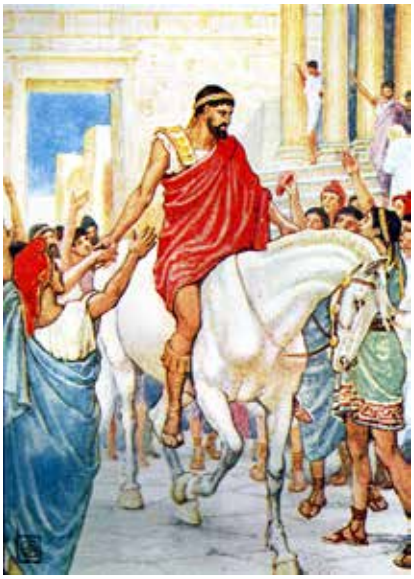

Figure 5: An illustration of Likurgus greeting the people of Sparta, (Macgregor, accessed 01.11.2014)

3.3. Religious Utopia:

These utopias are religion-based and have existed since the beginning of humanity. On the basis of the beliefs of a certain religion, a depiction of a 'paradise' is created, which can be considered a rehearsal of the happiness and beauty that good people will attain after death (Yale University Library, access 01.05.2020). The main purpose is to try to reconstruct the lost virtues and values in life after life or in life that is interrupted. In some beliefs, with the focus, purification from the current life and increasing the level of awareness, adherents gets away from the concept of 'place' and reaches the 'summit', which can be considered a utopia in the realm of thought. Although there are many examples related to this subject, two of them were chosen because they reflect general features.

Example

The Shaker movement, which began in England in the 18th century and then spread to America, was described as a radical Christian sect. Shakers got their name from their ecstatic convulsions during worship. They believed in a single, communal life and forbade marriage and children. They created a self-sufficient lifestyle and produced all kinds of implements necessary for daily life, embracing the values of functionality, simplicity and beauty (Stein, 1994). One of their holy buildings is below (See Fig.6).

Figure 6: A Shaker structure, Hancock, Massachusetts, (Stein, 1994)

Example

William Riker argued that he represented pure Christianity when he founded his sect in 1919. They advocated celibacy, moderation, white supremacy, self-sufficiency, happiness and harmony with nature and gender. It is known that while the first commune was initiated by Riker, a field of 57 hectares, in the 1930s, while 300 people lived in this area, although the utopian life ended spatially in 1959, there were members of the cult that believed that this life was the most correct and that it would be lived in this way in the future (Fuller, 2011).

3.4. Scientific and Technological Utopia

These utopias were built for the future. Their common features can be listed as follows:

-Advanced science and technology

-The elimination of pain and suffering

-Fundamental changes in human nature

This technology gains an artificial meaning by affecting people's normal functions such as eating, eating and giving birth. Other forms of these planned utopias include people disrupting the balance with high technology and increasing standards of living (e.g. utopian cities in famous science fiction movies: *Star Trek, The Fifth Element, Metropolis* etc.), (see Fig7–8).

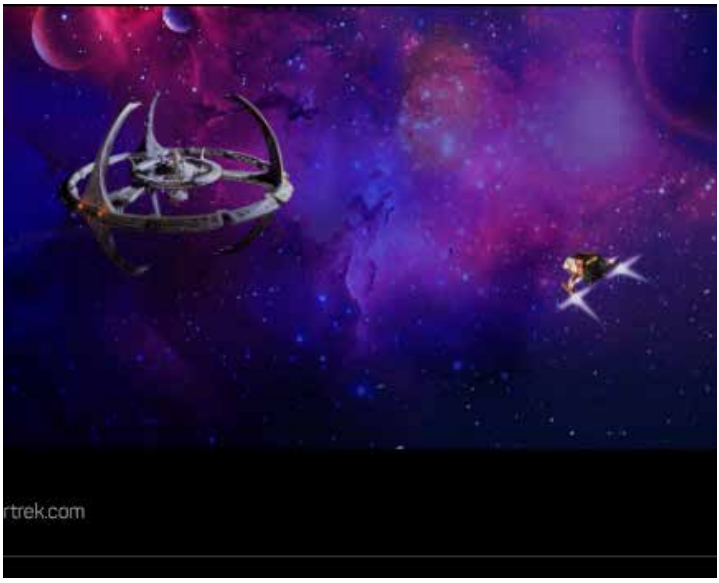

Figure 7–8: Examples of utopian city depictions from science fiction movies, (Magid, 2019); (Jeffries, 2020)

4. Utopic and Dystopic Approaches in the Literature and Cinema Industry

The utopic and dystopic products in literature and cinema are mostly dystopic. The audience and the readership of the works produced in this type are more widespread due to the potential to be supported by fear, tension, adventure, crime, science and fiction. The following are popular, well-known examples of dystopian novels and their authors, and dystopian films and their directors:

Table 1. Some dystopian novels and movies:

We - Yevgeniy Ivanovich Zamyatin
Nineteen Eighty-Four (1984)- George Orwell
Me - Ayn Rand
Brave New World - Aldous Huxley
Fahrenheit 451 - Ray Bradbury
The Handmaid's Tale - Margaret Atwood
Iron Heel - Jack London
The Hunger Games - Suzanne Collins
When You Wake - Hillary Jordan
Incompatible - Veronica Roth
Swastika Nights - Katharine Burdekin
Metropolis - Fritz Lang
Last Hope - Alfonso Cuarón
Faq: Frequently Asked Questions - Carlos Atanes
Blade Runner - Ridley Scott
Equilibrium (Riot) - Kurt Wimmer
Brazil - Terry Gilliam
Old Seats - Tanju Berk
Vampire Empire - The Spierig Brothers
V For Vendetta - The Wachowski Brothers

5. Research on Utopias in Urban Planning in Academic Literature

When the use of utopias in academic literature in terms of urban planning is examined, it is examined that this issue has been handled very recently in the literature and research on the topic has not been widely published.

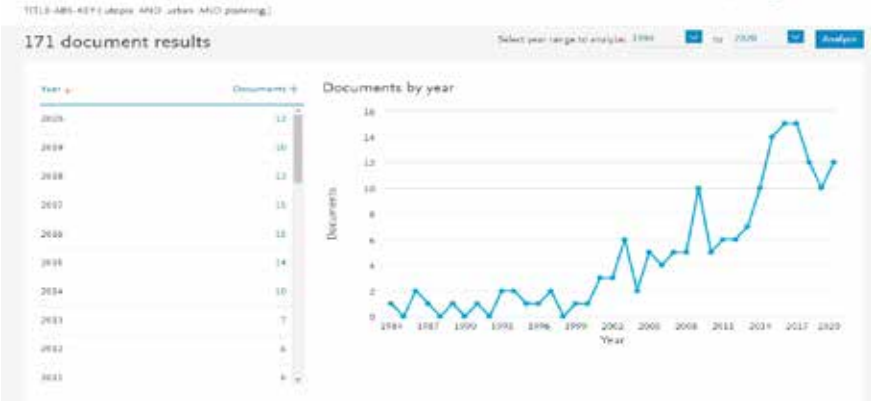

Figure 8: Academic publication status of 'utopia' and 'urban' and 'planning' by years, (SCOPUS, access 01.05.2020)

In 1984, the first academic study on the subject was carried out. Since then, only 171 documents have been published. As can be seen in Fig. 8, the number of publications increased sharply after 2014.

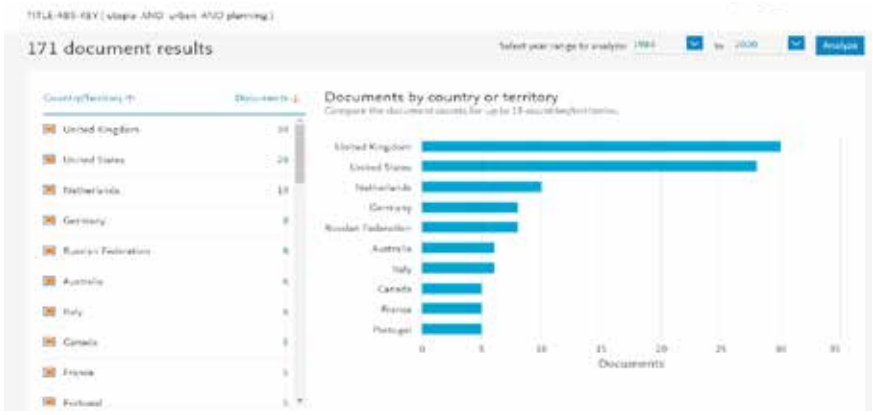

Figure 9: Academic publication status of papers on 'utopia' and 'urban' and 'planning' by country or territory, (SCOPUS, access 01.05.2020)

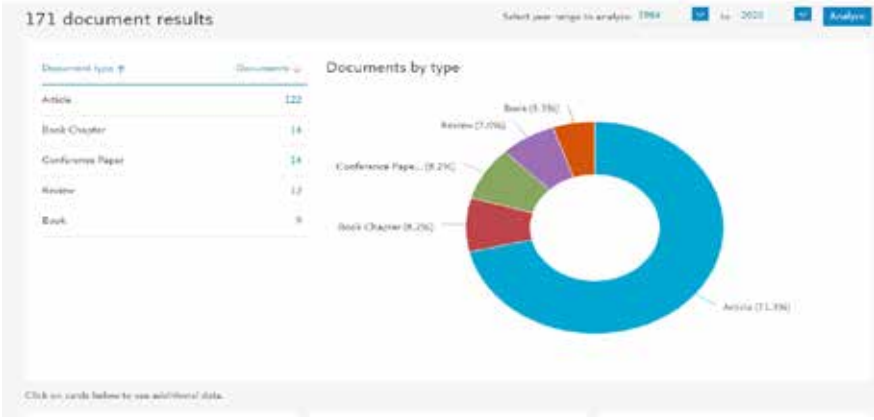

Figure 10: Academic publication status of 'utopia' and 'urban' and 'planning' by type (SCOPUS, access 01.05.2020)

When the distribution of the published studies according to the type is examined, it is determined that the academic studies produced as the article by 71% is dominant. This is interesting because many references are produced as a book used in this chapter. As a result, it can be said that the issue of developing ideas for the future of cities through utopias is not a priority in the literature.

6. Thinking About Cities of the Future

While thinking about the future of cities, it is determined that the following items, which today's cities must meet globally, will be the leading elements:

-Technological advances

-Increasing population growth and uneven distribution of welfare on the world

-Decreasing natural resources and the size of the unfair distribution

-Increased wars (nuclear, biological, cold, water, etc.)

-Failure to ensure food safety

-Unpredictable events (pandemics, climate change, natural disasters, etc.)

Looking at these highlights, it is evident that the future of cities is developing in an environment of uncertainty, from the perspective of urban planning discipline. In this context, it is becoming more and more difficult to make future predictions based on scientific techniques and determinations. As Gürel (2010) stated in the Istanbul City Meetings Event: 'People look like what they eat, act like the cities which they live in.' From this point of view, we can get a clue about the balance of the built and unbuilt environment, which is actually the beginning of the whole urban ecological cycle for the future. For example, food security is directly related to natural land cover and urban planning policies. In addition, genetically modified foods those facilitate logistics and facilitate marketing with an element of difference, and synthetic food production-consumption that can be produced in 3D printers, are increasing. The fact of living deeply in an ecological/organic life culture that develops as a reaction and the greenwashing sector, which abuses this organic life approach, adversely affect the future of human nature. Urban planning problems that require a common solution at the cities in different geographic areas and at different economic or social development levels often create unsolved chaos areas at the global level (See Fig.11–14).

Figure 11–14: Some global examples of current and future unsolved problems—clockwise from top left: 3D food (Koenig, 2016); climate change (Dege, 2019); cheats on organic life (MedyaSpot, 2010); crop infestations, drought, (Baxter, 2019) ; artificially shaped cube watermelon (Gunders et.al., 2016)

The Latin writer Publius wrote in 35 BC: 'Tomorrow is today's student, and today is yesterday's.' It means that the present should be taken as a basis for thinking and planning for the future. Therefore, the current built environment and remarkable examples of urban planning and architecture in the cities are a preview, of s–orts, for the future. In particular, the implemented examples which are mismatched with the general characteristics of the other parts of the city, territory, neighbourhood, street, or building should be needed to examine on their reasons and results to the city.

Figure 15-16: Views from Şişli and Beykoz Districts of İstanbul, (Anadolu Ajansı, 2019)

The examples above (See Fig.15-16) can represent as good examples to sum up identification, texture, attachment, infrastructure problems in urban planning and architecture of Turkey in 2019. It is seen that even current daily standard urbanisation problems will take time to solve. In conclusion; while we can construct future cities in a more dystopian way, for now, urban planning needs to be guided by interventions, in order to create liveable cities for the future.

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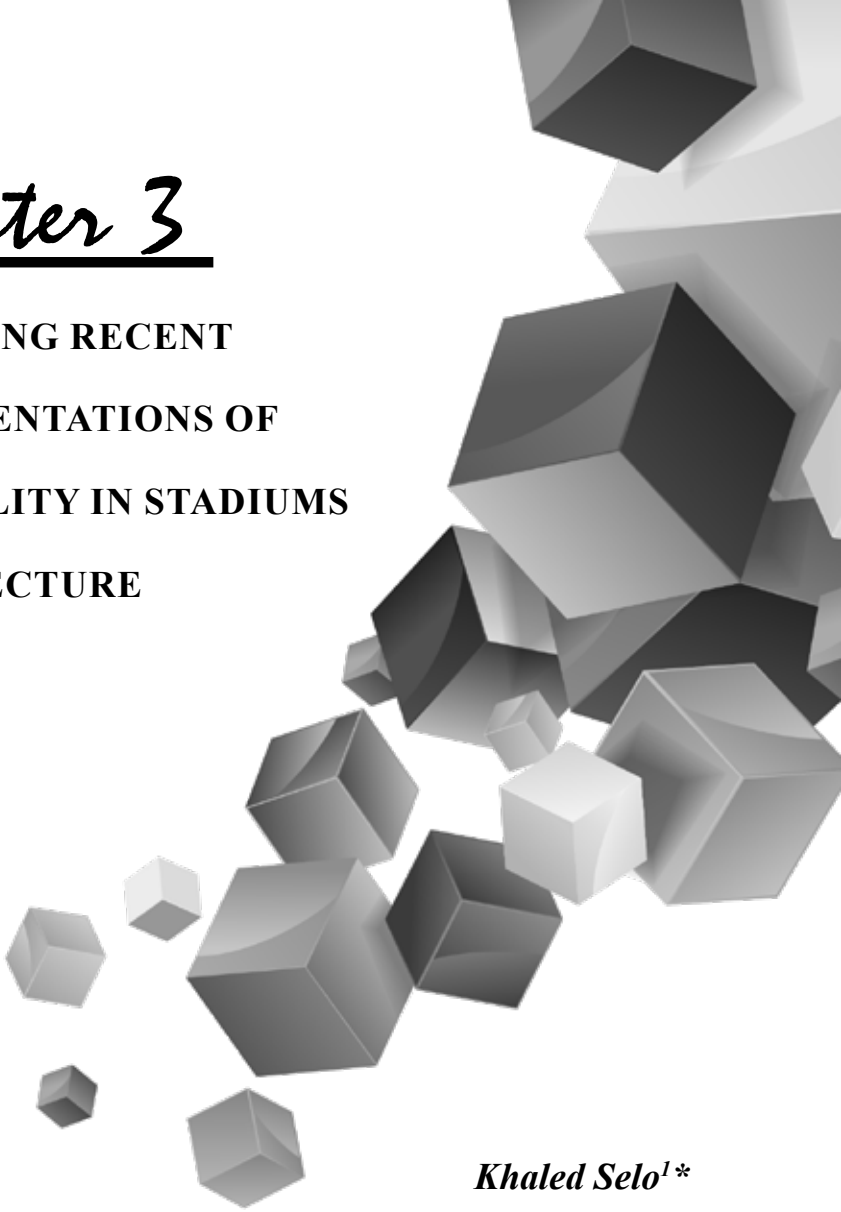
Chapter 3

EXPLORING RECENT IMPLEMENTATIONS OF FLEXIBILITY IN STADIUMS ARCHITECTURE



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1. Introduction:

Stadiums today have considerable multi directional impact on the urban, environmental, social and economic context. Individually or along with other stadiums and/or group of sports venues, stadiums can work as a catalyst of urban development and local economy (Corwin, 2011), contribute tourism offer and cities' or countries' image and economics (Ahlfeld & Maenning, 2011), (Humphreys, 2019), promote place marketing (Ren, 2008), can individually host/draw as much as 1 million visitors per year (Waste Management, n.d.), host events that can be viewed by great numbers of people around the world simultaneously and according to FIFA *are the most effective international marketing platform* (FIFA.com, N.D.)

Although today they are subject to rules and regulations that attempt to minimize environmental impacts in their life-cycle (Grant, 2014), stadiums can still create considerably large energy demands, create large amounts of waste, emit large amounts of associated greenhouse gases (Aquino & Nawari, 2015), (Waste Management, n.d.) and waste large amounts of materials, labor and economic resources, when not planned and designed appropriately.

Many of the previous concerns can be overcome or minimized with proper operation/management, as in the case of waste management, and use of related technologies such as solar panels, as in the case of energy consumption. However, the problems related to improper architecture/ design and planning, such as building stadiums with capacities that exceed long-term perpetual local needs and/or in improper location, could have permanent and irreparable consequences. This is most seen in the cases of stadiums that are built for and according to the needs of temporary short but relatively large events, or in a hope/aim of hosting such events in the future, without taking into consideration long-term local needs and use of these venues. These stadiums are often called "White Elephants" (Davis, 2019) (Salas, 2018) (Wahl, 2016), or Green Monsters (Grant, 2014).

Mostly in recent years, many architectural implementations/initiatives were adopted tend/claim to overcome/decrease negative impacts related to stadiums and to make them more environment-friendly and/or sustainable venues. These implementations mainly consist of either temporary configurations/setups or the ability of stadiums to change or adapt to changing circumstances. These implementations were investigated/ explored/studied and in this paper are(were?) defined as "Flexible Architecture''.

Flexibility in stadiums is as old as stadiums themselves and have been adopted for practical or/and economic reasons (Selo, 2019). However in last 25-30 years, implementations/adoption of flexible architecture

emerged/accelerated and can be considered *"a realistic response to the emerging sustainable construction agenda"* (Gosling, Naim, Sassi, Iosif, & Lark, 2008, p. 8) and were possible due to increasing rate of technological progress (Slaughter, 2001). However, flexible architecture as part of sustainable development or sustainable construction can also be seen as *part of campaigns that aim to waver public opinion, in the light of corruption revelations against IOC* (Horne, 2011, p. 215), a mean to justify *buildings that shouldn't have been built at all* (Bernstein, 2010) and '*as part of environmental management at mega events are partly utilized to ensure environmental protection but also exploited for Greenwashing'* (Fitschen, 2006).

In chapter 2, a literature review of flexibility in architecture is taking place, then followed by a definition/explanation of flexible architecture. In the third chapter, a (collective?) case study of multiple stadiums from the last 25 years is made.

2. Flexibility in Architecture:

Flexibility in architecture could be considered as old as the buildings themselves, in the form of small flexible element such as doors, windows or movable places such as tents. However, the use of the term flexible/ flexibility in architecture discipline is relatively new. The meaning itself started to show up/getting used in early 20th century by (st)architectes, as a reaction to principles such as "form follows function" that were considered limiting users, and to give freedom to users and give building the ability to change or accommodate to change. The flexibility term itself has tangibly been used since the middle of 20th century (Kızmaz, 2015), (Rabaneck, Sheppard, & P.Town, 1973), (Norberg Schulz, 1966). The Dom-Ino prototype house by Le Corbusier and Dymaxion House by Buckminister Fuller are two different examples of early tangible use of flexibility in architecture. Architectural schools and movements such as Archigram and Metabolism raised the integration of flexibility from small building scale to urban scale with proposal such as plugin city (citation and maybe pictures) and actually built examples such as the Nakagin Capsule Tower. A comprehensive research that were made by Sebestyen (1978) and included many individuals and regions states that the term flexibility could have different meanings/uses between regions and also between individuals inside the same region as well. In the end, he states that while terms such as versatility, adaptability, changeability and elasticity were used along or instead of flexibility, the term flexibility is "the most correct" term and should be used instead or above other similar phrases (citation). In another study, Pena & Parshal (2001) states that flexibility is often misunderstood or used with a narrow or a single/limited meaning or singularly used either instead of adaptability, convertibility or versatility

but concludes that flexibility is a comprehensive phrase that includes all of these words(citation). In a more recent study, Farrow, Labrador & Crews (2012) state that there are three types of flexibility: Adaptability, convertibility and transformability and explain each one in detail. Slaughter (2001), Webb et al (1997)and Brand (1994) have exhaustive studies related to definition of flexibility, need/reasons for buildings to accommodate/ adapt changes and are recommended for further research.

In this research/article an architectural/built environment is defined/ considered flexible when it is:

1- Multi-functional/have multiple functions: or social and urban flexibility

2- Scalable (able to be changed in size or scale): able get bigger or smaller. (Not expandable as it is one-way; getting bigger.)

3-Changeable: Adaptable, convertible or transformable

4-Temporar: temporary built, built for relatively short period

And/or

5- Mobile: the ability of built environment to change/switch location

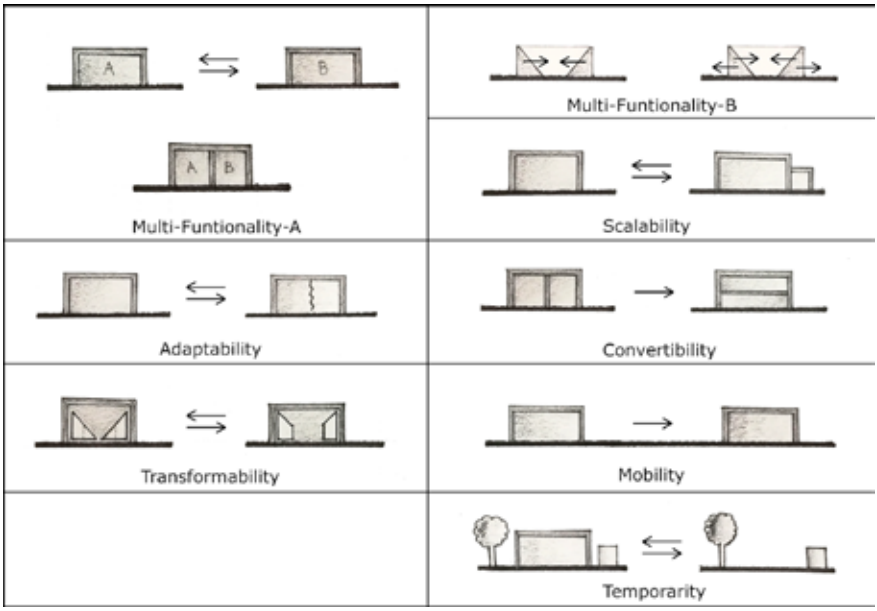

Fig.1. Flexibility types, classes or characteristics

Comprehensive features are further divided/separated and are explained in detail along with all features.

1- Functional Flexibility: This feature is subdivided into two branches, the first one is multi-functionality related to sports functions and the latter is related to urban/social or "general'' functions.

1.a: Multi-Sports Functionality: (Multi-Sports Venues): When a stadium (or any other sports venue) can host more than single sport event, simultaneously or at different times, it is a multi-sports venue.

1.b: Urban/Social Multi-Functionality: When a stadium or any other sports venue) have functions related to both sports and non-sport functions, functions that also "serve" people outside the stadium and not only at game-time, for example, concerts, restaurants, meeting rooms, conference halls/rooms, museums etc.

2- Scalability: The ability of the built environment to expand or shrink (getting bigger or smaller), most commonly with adding or removing new spaces, parts or elements.

3- Adaptability: The ability of the built environment to change or accommodate/adapt to change with minimal or low effort, resources and/or time. Such as moving partitioning walls, curtain walls, removable floors.

4- Convertibility: Changing or partially changing the built environment permanently, using relatively long period of time, much effort or resources. The new achieved could be `converted` back to a situation similar to previous/old one but again with permanent and costly methods.

5- Transformability: The new flexibility type is benefiting from new technology that allows the building the permanent ability to fully or partially change/transform between desired state/statutes. For example, retractable seats, moving floors and opening/closing roofs.

6- Modularity: The ability to build multiple variants/systems (in this study's case; buildings or designs) from the same group of elements modules. For example; various floor plans can be achieved in a building that have the same structural and MEP elements in all floors.

7- Mobility: The ability of the built environment to move (or be moved) or change its location.

8- Temporality: If a built environment is built temporarily, for a relatively short period of time and were built according to, with no hard/permanent techniques and methods, then it is considered flexible.

If a built environment fully or partially has one of the previous features in its life-cycle, then it is flexible.

However, when stadiums were chosen for this research, the flexibility were only related to stadiums main places which are stands, and playing field. The stadiums with moving (opening/closing) or illuminating roofs

and facades are technically flexible, however, the flexibility here is not affecting/related to stadiums main places (field and stands) functions, therefore were not included.

For a qualitative and recent understanding of flexible design approaches, stadiums that were constructed, went through major renovation or proposed in the last 25 years were selected. These stadiums were reviewed under criteria such as;

a-the type of flexibility in this building, e.g. Modularity, Transformability etc.

b-when was it planned or decided? E.g. was it prior to design/ construction or afterward.

c-did everything went according to what was planned?

d-what was the cost of adopting flexibility? E.g. Is it really just additional initial cost that have quick return in the future? Did it cause some unseen problems or additional costs?

e- Results and consequences.

3. Case Study of Flexible Stadiums from last 25 years

3.1 Centennial Olympic Stadium:

3.1.1 Overview:

This venue was designed as an Olympic stadium in 1996 Atlanta summer Olympic games that would subsequently be converted to a baseball stadium. After hosting the 17-day games the stadium was successfully converted into a baseball stadium in an 8-month period and were used for almost 20 years. In 2017 and after the main user team of the stadium moved to another field, the stadium has again been converted into an American football stadium in a respectful manner to the original one. (Ballparks. com, N.D.), (McQuade, 2017), (Tucker, 2017), (Newberry, 2017), (Heaton, 2016), (Moriarty, 2017).

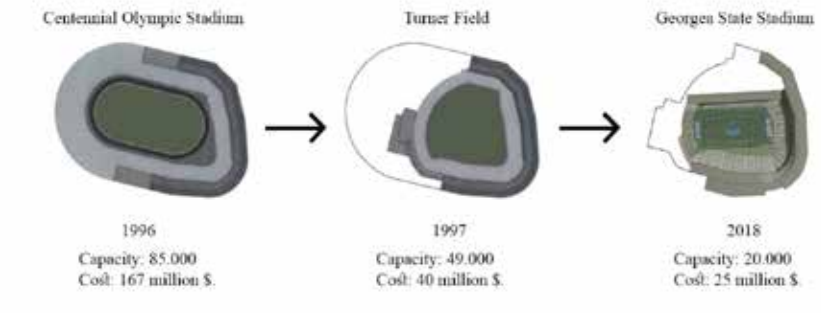

Fig. 2. Overview of flexibility in Centennial Stadium (Jakimovska, 2007) (McQuade, 2017)

3.1.2 Conclusion:

This unique example/solution may have had higher initial costs due to additional conversion costs but as the stadium wasn't left empty/unused after the Olympics and were used for a long period of time this can be justified. The second conversion hasn't taken place in the original plan but is successful and justified as it prevented building a new stadium, used the already existing infrastructure in the region and maintained the legacy and memorial of a place that has a great historical background (the Olympic games)

3.2 Stadium Australia:

3.2.1 Overview:

This stadium was originally built for Sydney 2000 summer Olympic games. One of the main goals of the host country was to build the biggest Olympic stadium ever, with a capacity of 115.000. However, green promises were part of the Australian bid to win the Olympics and they did not want to be left with a "white elephant" that would be difficult to get utilized and eventually stay empty after the games. To achieve this, an Olympic stadium was initially built with a temporary total capacity of 115.000. After the Olympics the capacity was reduced to 80.000, by removing upper long stands at both ends of the stadium and the roof were completed by covering the remaining seats. The existing Olympic field was also reconfigured and converted to a large oval multi-purpose field for football, rugby, cricket and Australian football. (ANZ STADIUM, 2013), (datuopinion.com, 2011), (StadiumDB.com, ANZ Stadium (Stadium Australia), 2016), (The Irish Times, 2000), (Glanville, 2018)

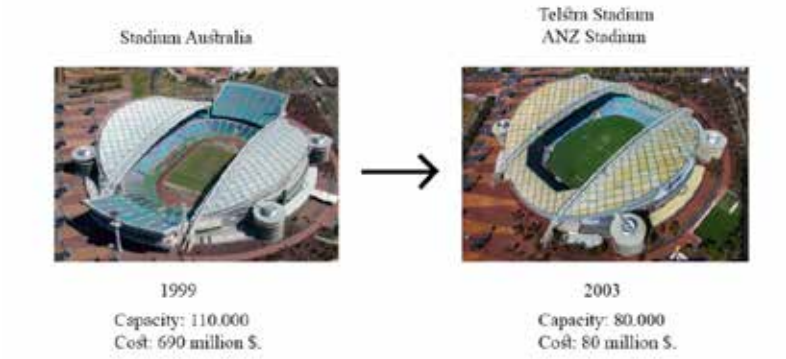

Fig. 3. Overview of flexibility in Stadium Australia (datuopinion.com, 2011) (Rhope, 2014)

3.2.2 Conclusion:

The conversion of the stadium took almost 3 years and cost $300 million (reference and edit image). The athletic field and surrounding seats were reconfigured and converted to a larger oval field, due to the requirements of the Australian football. In other modes (mainly rugby or football) lower stands are pulled closer to the field but are still far when compared to rectangular stadiums. Despite this the stadiums have been used on a regular basis mainly for previously mentioned sports along with non-sport purposes such as concerts. Recently there was a plan for demolishing the stadium and building a new one but later the project changed into a large-renovation project were two thirds of the existing stands will be demolished and a new rectangular field and stands will be created for almost half of the cost of the initial complete demolition and building a new stadium project.

3.3 Sapporo Dome:

3.3.1 Overview

This unique stadium was built in 2001 in Sapporo city of Japan and was one of the 10 Japanese (along with Korea) venues of the 2002 FIFA football world cup. The unique stadium has closed roof (dome) and a movable pitch that can be moved outside/into the stadium. The stadium has two main modes; football mode (with movable pitch inside), and a baseball mode and both modes have approximately the same spectator capacity of almost 42.000. (Bureau of Olympic and Paralympic Games Tokyo 2020 Preparation, 2015), (DETAIL inspiration, 2009).

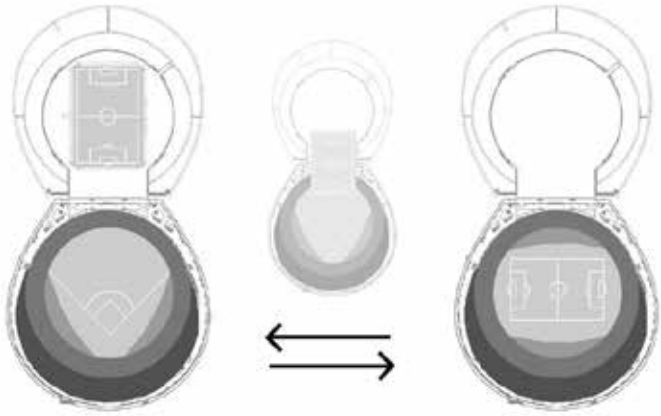

Fig. 4. Overview of flexibility in Sapporo Dome baseball mode (left), Football Mode (Right)

3.3.2 Conclusion:

Since its construction in 2001, the stadium has been used on a regular basis. It has been a home to one Japanese professional football team and one baseball and hosted various sports and international events such as the 2002 FIFA World Cup, 2007 FIS Nordic World Ski Championships, 2008 and 2010 Rally Japan, 2019 Rugby World Cup, and is one of the hosting venues of 2020 Tokyo summer Olympic games. The benefit of this unique flexibility approach: various sports and setups in one place, using natural grass in closed place.

3.4 Stadion Wals-Siezenheim:

3.4.1 Overview:

Commercially known as Red Bull Arena, this is a football stadium in located

Wals-Siezenheim suburban of Salzburg, Austria. It was built in 2003 for FC Redbull Salzburg with a capacity of 14500. In 2007 The capacity was expanded to 32.000 for the 2008 European Championship. (ANZ STADIUM, 2013), (Football Stadiums, N.D.), (StadiumDB.com, Red Bull Arena , 2017) (Red Bull Slazburg, 2018).

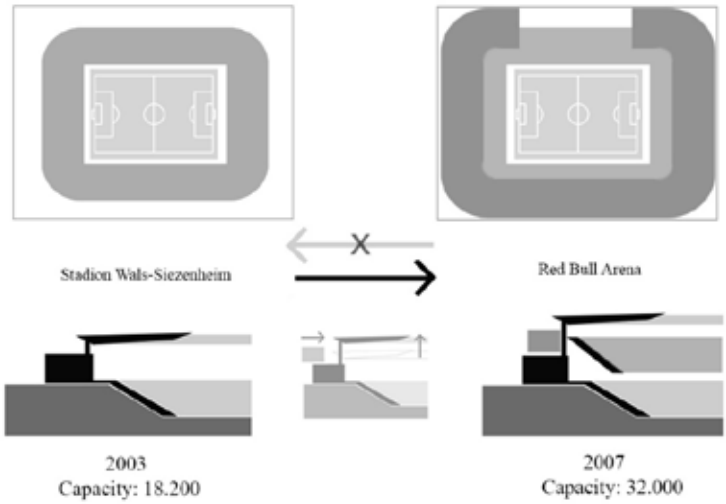

Fig. 5. Overview of flexibility in Stadion Wals-Siezenheim

3.4.2 Conclusion:

The expansion of the stadium in 2007 was made possible by moving the existing roof up and installing a new tire/tribune above the existing one. The expansion was tended to be temporary and the stadium was supposed to be converted back to its initial state after 2008 EC as neighbors were opposing a permanent expansion and agree on a temporary one because the area already had a traffic problem. However, in 2009 it was decided to retain the new state of the stadium, and the stadium has been used in regular basis since then. (controversial: flexibility can be used to trick/fool people?)

3.5 London Stadium

3.5.1 Overview:

The main stadium of the 2012 Summer Olympics was completed in March of the same year as 80.000 Olympic stadium. In a promise to keep the stadium utilized after games, the stadium was planned to be converted to a 25.000 Olympics stadium after the Olympics by changing the roof and removing the upper that has 55.000 capacity. For this and other features such as using 40% less steel than the 2 times bigger! Previous Olympic stadium Bird's Nest, it was advertised as a sustainable stadium. (BBC. COM, 2018), (Bryan, 2013), (Populous, 2018), (Samuel, 2018)

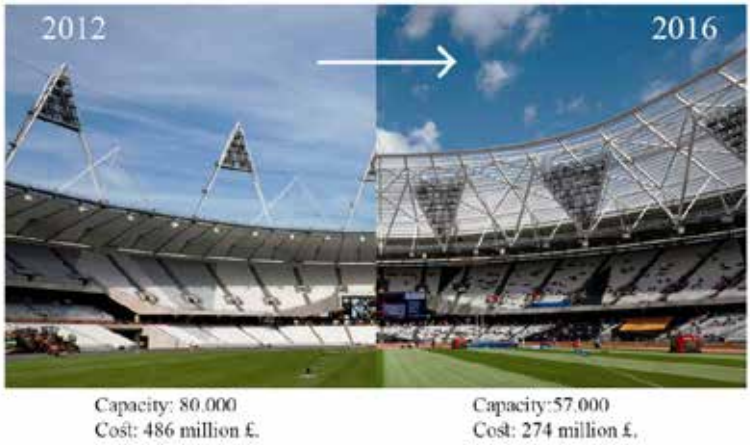

Fig. 6. Overview of flexibility in London Stadium, First Conversion, Image Source: (Populous, 2018)

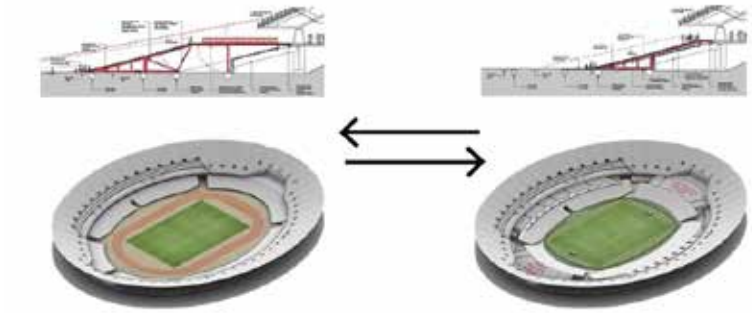

Fig. 7. Current state(s) of London Stadium (Bryan, 2013)

3.5.2 Conclusion:

After the Olympics the stadium had dramatic changes in events. Nothing went as planned at all. The roof was demounted but after that it was decided to make the stadium a 66.000 multi-purpose stadium (60.000 in football mode and 80.000 in concert mode). For this new purpose, upper temporary 55.000 seats were made permanent, lower 25.000 permanent concrete seats were replaced by movable seats so these seats get closer to field in football mode and be moved back in athletics and concerts modes. A new roof was constructed to replace the previous roof that was uselessly demounted as the stadium layout didn't change later. All these renovations too almost 4 years and cost almost $350 million dollars. The stadium

is now being used by West Ham Football Club for £2.5 million a year. However, E20 Stadiums, the owner of the stadium, is claiming to have operating loss of higher than £20 million a year, 6 million of which are costs of transforming the stadium between football mode and athletics and concerts modes. (Slater, 2019), (Gibson, 2016), (Etchells, 2017), (Singleton, 2012), (Ziegler, 2018), (Whetstone, 2017), (Lucas, 2019).

3.6 Incheon Asiad Main Stadium

3.6.1 Overview:

Located in Incheon, South Korea. This is a 60.000 athletics stadium and was the main stadium of the 2014 Asian Games. Capacity was planned to be reduced to 30.000 and the removed part of the stadium was supposed to be converted to multi-purpose landscape/park after the 2014 Asian games. The stadium has two huge oval roofs that extend out of the stadium. The stadium cost almost $430 million. This how the architect firm of the stadium Populous describes the project; “We wanted to take a fresh look at the way we treat adaptable stadia in Incheon...Rather than considering how we could shrink a 60,000 seat stadium, we turned the idea on its head and thought let’s build a 30,000 seat stadium and add 30,000 temporary seats.” (StadiumDB.com, 2015).

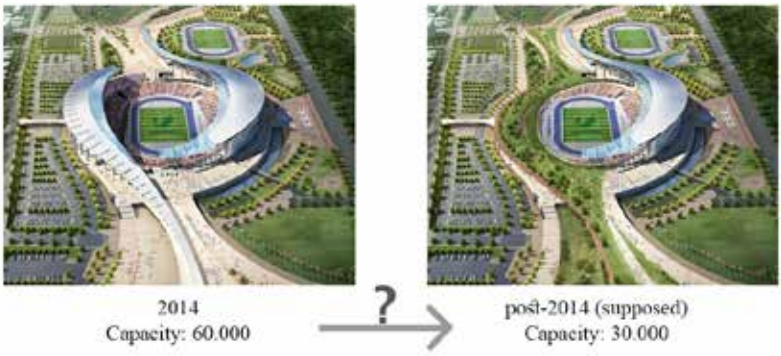

Fig. 8. Overview of flexibility in Incheon Asiad Main Stadium (StadiumDB.com, 2015)

3.6.2 Conclusion:

No information was obtained about the original schedule or timeline of the conversion of the stadium. However as of 10.10.2018, only seats are removed of the supposedly removable half while the massive roof is still retained. According to StadiumDB.com (date) the structures aren’t temporary technical-wise. (Park, 2018)

3.7 Ekaterinburg Arena:

3.7.1 Overview:

This stadium was of one of Russia 2018 FIFA World Cup's stadiums and it is located in Ekaterinburg city of Russia. It was first built in 1956 as an athletic stadium. In 2011 renovation works were finished as the athletic field were converted to a rectangular field and the capacity were upgraded to 25.000. The previous exterior wall was preserved as it was on Russia's heritage list. 10.000 temporary seatings were added before 2018 and the stadium hosted the world cup with 35.000. The temporary seatings were planned to be dismantled after the world cup (Kozin, 2018), (StadiumDB.com, Russia 2018: Downsizing in Yekaterinburg to begin in July, 2018), (Macphail, 2018).

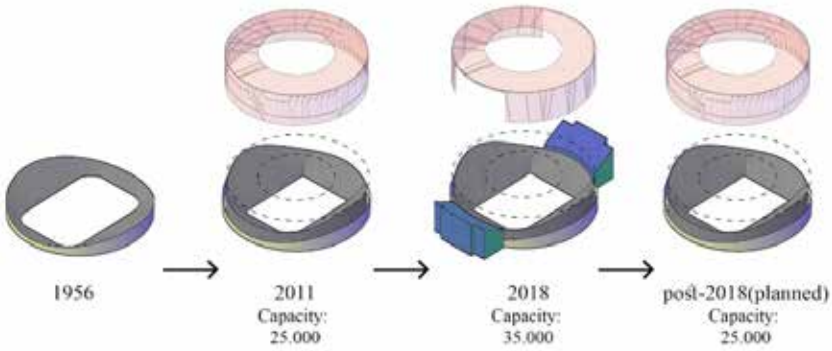

Fig. 9. Overview of flexibility in Ekaterinburg Arena

3.7.2 Conclusion:

When renovation works started in 2006, Russia has not been awarded World Cup hosting yet. In 2010 the announcement was made but the renovation was almost finished. The stadium capacity should have met the minimum allowed capacity of 40.000 but stadium was already renovated. After it was suggested, the FIFA approved the reduction of minimum capacity to 35.000 and 10.000 temporary seating were installed and the stadium escaped without going through another major renovation. These new seats are not equipped with any amenities: there is no roof over them, there is no elevator up, and there are no warm rooms and toilets. The removing process was supposed to begin right after the world cup with a very modest amount, when compared to previous examples, roughly $15 million. However, as of June 29, 2019 the process has not started yet (Flint, 2019) .

3.8 Morocco 2026 FIFA World Cup Modular Stadiums:

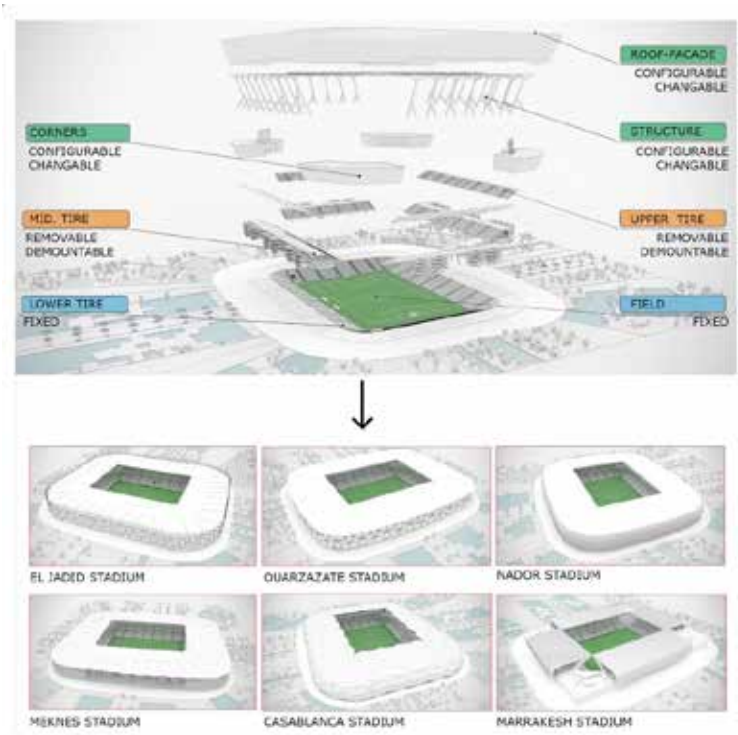

Fig. 10. Overview of flexibility in Morocco 2026 Proposal (SportBusiness, 2018)

The Moroccan bid/proposal for 2026 World Cup included five existing stadia, 3 already planned and six modular stadiums. The modular stadiums, which all were proposed with identical capacity of 46.000, were divided into 3 types of sub elements/parts. These parts are;

1-Permanent/fixed parts: those are identical in all six stadiums and are; field and lower tier.

2-Removable/demountable parts: Mid and upper tiers, and

3-Configurable/Change parts: Parts that varies from one stadium to another and are, corners, roof, façade and structure.

Each of this would've been reconfigured according to locals needs, capacity could have been downgraded to as low as 20.000 and the unneeded parts would have been removed and sent to "where needed" (Campelli, 2018), (SportBusiness, 2018). This unique proposal won't see light as Moroccan bid lost to Canada-Mexico-USA's bid but is included in this research to provide information about current design approaches and ideas which may provide better solutions in the future.

3.9 Overview of flexibility characteristics of each stadium:

 : Strong or high,  : Mid, low or partial, -: not available

	Multi-Sports Functionality	Urban Multi-Functionality	Scalability	Adaptability	Convertibility	Transformability	Modularity	Mobility	Temporality
Centennial Stadium				-		-	-	-	
Stadium Australia							-	-	
Sapporo Dome			-		-		-	-	
Stadion Wals-Siezeheim	-			-		-	-	-	-
London Stadium			-	-			-	-	
Incheon Asiad Main Stadium				-		-	-	-	-
Ekaterinburg Arena				-		-	-	-	
Morocco 2026 WC	-	-	-	-	-	-			

4. Conclusion

This paper studied flexible architecture in stadium examples from last 25 years.

Literature was reviewed to have a better understanding of flexibility in architecture and a definition were made to classify (sınıflandırmak, tanımlamak) these implementations and their characteristics.

Stadiums that adopted flexibility from the beginning of their life-cycle, may have had higher construction costs due to additional conversion/ renovation costs and also costs of using non-permanent technics and materials (instead of permanent and cheap methods such as concrete). These additional costs saved some stadiums from turning into “white elephants” as in the case of Centennial stadium. Stadium Australia went through similar experience and the stadium is still being utilized, however,

the stadium had an oval large multipurpose field that wasn't ideal for football and rugby and spectators of these games had poor view of field. In London Stadium's case, flexibility not only didn't work but also led to additional costs and problems.

Sapporo dome may have additional both construction and operational costs but these costs can be justified as it prevented building another stadium and protected from extreme weather.

In the case of Stadion Wals-Siezenheim, flexibility was integrated subsequent to the design and construction stage. However, the temporary state was made permanent later despite refusal of locals who earlier accepted the conversion of the stadium only because it was temporary (Salzburger Nachrichten, 2009). This can add up "tricking people" to the "greenwashing" claims related to flexibility and sustainability.

The Incheon Asiad main stadium as well were supposed to be flexible but as stated earlier, were built with permanent methods and hasn't being converted according to the initial plan.

Similar to Stadion Wals-Sienzenheim, Ekateringburg Arena adopted flexibility after been constructed (or renovated) but with simple and relatively cheap way when compared to other examples. However, despite the ease and low cost of removing the temporary seats, these seats haven't been removed yet as stated earlier in this study.

The Moroccan bid's stadiums had some new ideas of flexibility in stadiums and can be inspiration source for better and more successful initiatives in the future.

In Summary, this paper tried to provide characterizations of flexibility in stadiums architecture and tried to shed light on its results, effects and/or consequences. For better results in future studies, this paper suggests multi-disciplinary studies that take in consideration immediate, short-term and long-term results, effects and/or consequences of adoption of flexible architecture. Stadiums that didn't turn to white elephants or wasn't abandoned after the main events they were built for may seem more successful than those that did. However, that could be due to state funding of these stadiums. Due to their great influence on masses both locally or internationally, stadiums could be constructed or being operated by state or state-backed capital or organizations (football clubs etc.), therefore problems related to sustainability could be condoned. State funding of stadiums should be taken into consideration and investigated further as it may cover and hide problems related to stadiums.

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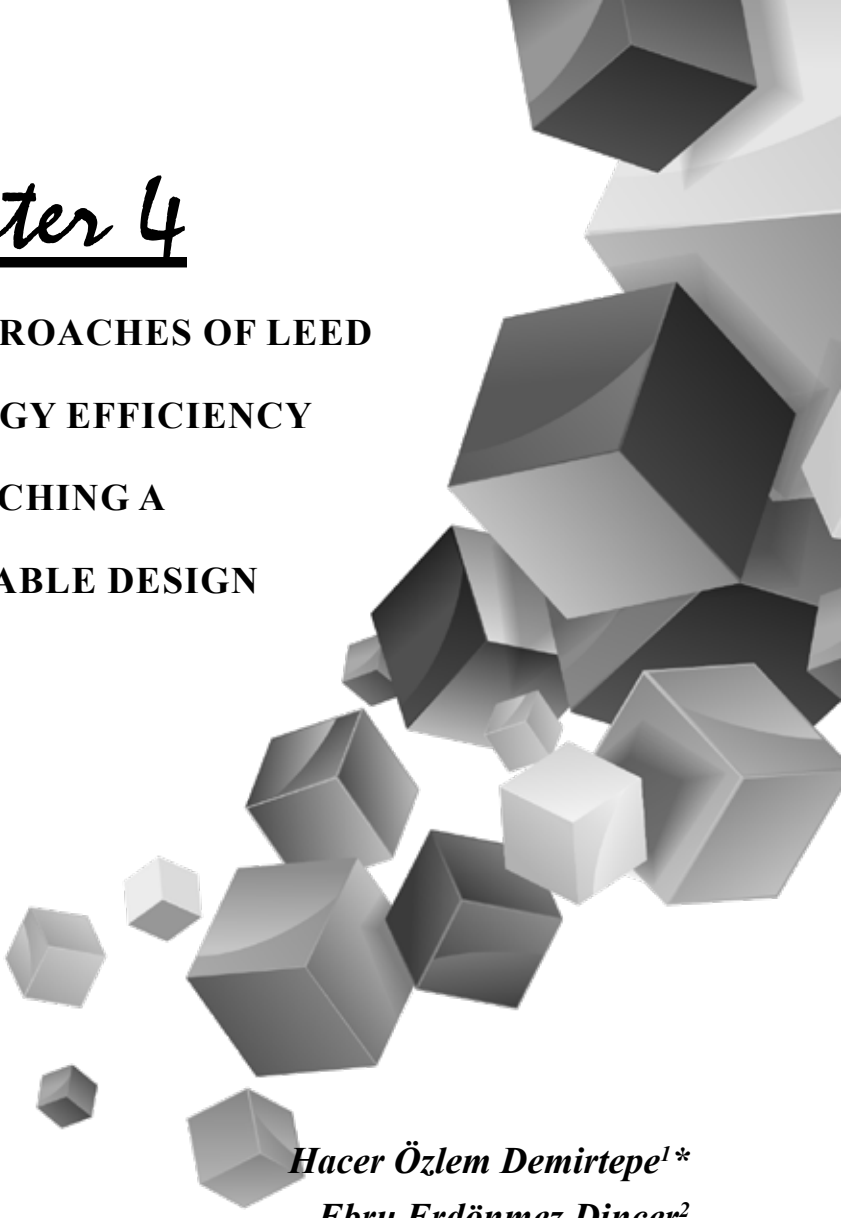
Chapter 4

NEW APPROACHES OF LEED ON ENERGY EFFICIENCY FOR REACHING A SUSTAINABLE DESIGN



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INTRODUCTION

Although it has been used in French and German languages for centuries, the word "sustainability" first appeared in the Oxford English Dictionary after the 1950s (Van Zon, 2002). Circumstances that lead to defining the word in the dictionary and the actual need for using world's resources in a sustainable way can be thought as the consequences of "Industrial Revolution", which ended up with excessive consumerism, unbalanced economic growth, pollution and destruction of the environment and unplanned urbanization.

Humankind faced the reality that the crucial resources such as wood, coal, and oil can actually be depleted by his own actions. For the only reason that he/she may not maintain his/her living standards for now and near future, he/she agreed that the way of thinking and acting should be changed in terms of limiting and eventually terminating the damage to the environment. By the late 1960s and early 1970s, the urge for the immediate change of the idea of progress arose by putting these actions in a more moderate context as we call nowadays "sustainable development" (Du Pisani, 2006). In 1987, World Commission on Environment and Development (WCED) published their report "Our Common Future" which identifies long-term environmental strategies for the international community. The term "sustainable development" was first defined in this report also named Brundtland Report to pay respect to the supervisor of the commission Mr. Gro Harlem Brundtland. It says: "Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs". According to the report, social equity, economic growth, and environmental maintenance can be achieved simultaneously and without regression effect of one to another (World Commission on Environment and Development, 1987). These three pillars of sustainability also known as "triple bottom line" was first identified by Elkington in 1994 as 3Ps "people, planet, profit" (Berkovics, 2010). Three-term then used as prefixes to the word sustainability: Environmental sustainability referring to nature-friendly development, economic sustainability referring to balanced economic growth, and socio-cultural sustainability referring to human well-being and continuity of improvement in terms of fulfilling human needs.

Human intervention with nature, unfortunately, eventuated with, depletion of resources, the thinning in the ozone layer, release of large quantities of greenhouse gasses, and the increase in acidification and oxidation potential of the atmosphere. The large volumes of solid, air, and water pollutants in our environment has been threatening and risking not only human health but also all ecological factors and the safety of all living creatures. (Khan, Sadiq, & Veitch, 2004). According to Goodland

environmental sustainability "seeks to improve human welfare by protecting the sources of raw materials used for human needs and ensuring that the sinks for human wastes are not exceeded, in order to prevent harm to humans" (Goodland, 2003). This definition implicates a limitation to the use of the world's resources while the economic progress policies are determined.

The strategy developed by OECD in 2001 establishes four features of environmental sustainability that are to be implemented: "Regeneration (renewable resources shall be used efficiently and their use shall not be permitted to exceed their long-term rates of natural regeneration), substitutability (non-renewable resources shall be used efficiently and their use limited to levels which can be offset by substitution with renewable resources or other forms of capital), assimilation (releases of hazardous or polluting substances into the environment shall not exceed their assimilative capacity), and avoiding irreversibility." (OECD, 2001). As it is inevitable for humankind to seek for improvement of quality of life in terms of both maintaining the wealth and socio-cultural enhancing activities, there should be some guidance about being responsible and sensitive on environmental issues. These are defined by Morelli and his students in four main titles: societal needs, preservation of biodiversity, regenerative capacity, reuse & recycle, constraints of non-renewable resources and waste generation (Morelli, 2013).

In the term of "sustainable development", "development" associates with improvement and a literal change, this is contradictory with "sustainable" that evokes something that is wanted to be lingered, maintained, or survived. In the same sense of conflict, sustainable development arose as a consequence of capitalist economy which exists on the fundamentals of excessive production and consumption cycle. It becomes to be a challenge to keep on progress in a sustainable way as the capital that is generated from the excessive cycles of the economy is not shared equally between all the segments of the society. Instead, wealth is transferred to only the privileges.

Knowing that world's resources are not unlimited to replace the goods that are to be created for getting destroyed or becoming useless in a short period of time, sustainable development should be considered in the economic conditions that we experience, and the new methods need to be implemented. According to Serageldin, sustainable development should focus on to maintain a permanent income for humankind generated from un-diminishing resources that is named as four kinds of capital: human, man-made, natural and social (Serageldin & Steer, 1996).

To build a sustainable economy three steps are presented:

- building a sustainable macro-economy

- protecting capabilities for flourishing
- respecting ecological limits (Jackson, 2009).

Social sustainability which became the subject of scientific researches on politics and other applied sciences only from the beginning of the 21st century is defined by Black as "the extent to which social values, social identities, social relationships, and social institutions can continue into the future (Black, 2004; Colantonio, 2007). Social sustainability is mostly considered as a complementary criterion for the other two pillars of sustainability or a concept that is to be evaluated separately from them for the professionals of the environment (Kosanović, Glažar, Stamenković, Folić, & Fikfak, 2018). Vallance, Perkins, and Dixon are from the group who treats the notion as essential to meet the requirements of environmental targets: "Only when people have potable water, healthy food, medication, education, employment, equity, and justice, they can change their behaviour and place their concerns on global warming, energy efficiency, and other environmental issues" (Vallance, Perkins, & Dixon, 2011). This interpretation of the phenomena reminds Maslow's pyramid of human needs (Maslow, 1943). Hierarchy of needs suggests that it is illogical to meet the need at the top of the pyramid without fulfilling the ones that stand at lower levels. It is perceptible that one can only worry about the continuity of humankind and well-being of future generations after their basic needs are met. According to an evaluation of Rapaport, the apprehension of environmental issues differs depending on the values, ideas, images, and schemata of the people, which appears to be the culture aspect of the case (Rapoport, 2007). Congruently in 2001 culture is defined as the fourth pillar of sustainability by Hawkes who explains a healthy society having four basic features: responsibility for the environment, economic health, social justice and cultural vitality (Hawkes, 2001).

As buildings account for a large share of resource depletion, energy consumption, and CO2 emissions released to the atmosphere, it becomes crucial to incorporate sustainability into the practice of design & build (Kern, Antoniolli, Wander, Mancio, & González, 2016). Three pillars of sustainability can be adapted to the construction sector as follows:

- Environmental criteria: The energy needs and primary energy consumption, CO2 emissions, and other environmental performance issues.
- Economic criteria: Life cycle costs, capital cost, and durability.
- Social criteria: Thermal and acoustic comfort, good levels of natural lighting, the maintenance of a good air quality (Chinese, Nardin, & Saro, 2011; Diakaki et al., 2010; Flourentzou, Brandt, & Wetzel, 2000).

In the 1970s concurrently with the crisis of petrol, "green building" concept was developed which is claimed as a practice that can reverse the global climate change (Haapio & Viitaniemi, 2008; Robichaud & Anantatmula, 2010; Yu & Kim, 2011). As a way of pushing the market into building "green" mandatory building regulations and voluntary sustainability assessment tools are developed. One of these tools is "LEED" that was introduced by USGBC in March 2000 after the pilot version 1.0 is reviewed and necessary changes were made (Lee & Burnett, 2008; Schwartz & Raslan, 2013). Then other versions followed as v2.2 v3 and v4 and finally v4.1. The goals for renewing the versions have been set as making LEED worldwide preferable, applicable, and easy to achieve (Holmes, 2018).

MATERIALS AND METHODS

A brief literature review is conducted in order to access the different definitions and interpretations of "sustainability" and its three pillars namely environment, economy, and people. Then the historical path is examined through its first appearance in dictionary and its very existence became crucially and inevitably an urge as a consequence of "Industrial Revolution".

International reports and academic publications are grouped according to the three pillars of sustainability. Different points of view have been revealed to get a better understanding of the concept. To point out the notion's contribution to the construction sector, LEED- Leadership in Energy and Environmental Design – assessment tool is preferred in this article.

Considering the building industry is responsible for 40% of the primary energy use among IEA member countries, energy efficiency in buildings from design to occupancy and operation became an area which deserves to be paid utmost attention (Houssin, Saheb, Lebot, & Alers, 2013).

The assessment tool LEED has most weight in energy efficiency in measuring the value of design, construction, and building operations through their success in reaching the environmental sustainability goals.

In order to go deep in the strategy, LEED prefers to follow to create an energy efficient and comfortable building, the credits and prerequisites of Energy and Atmosphere category of v4.1 are examined. The reason to update the version of v4 to v4.1 of LEED rating system is documented below with a methodological comparison.

RESULTS

The way that energy is supplied and consumed by the building sector, has become very important when it is discovered that the industry is

highly responsible for its contribution to global climate change. Climate change is known as an outcome of releasing an enormous amount of CO2, a greenhouse gas, to the atmosphere consuming fossil fuels, which are diminishing resources of the earth (Scofield & Doane, 2017). To reverse the effect that threats the survival of humankind and other species, the method with two requirements should be established and implemented through all industrial decisions:

- Energy efficiency
- Renewable energy production

LEED describes energy use management in buildings as “efficiency first” approach which means a building that uses a huge amount of energy is not acceptable even if its energy source is not grid based in other words is from renewable sources. Thus, LEED recommends first to reduce the size of the problem through energy efficiency and then search and implement the green energy solutions for further (Green Building Education Services, 2014; Scofield & Doane, 2017).

Overview of LEED energy credits

In LEED v4.1, NC the “Energy and Atmosphere” EA category has four prerequisites (with no points) and six credits (a total of 33 points). It is given the highest weight having 30% of all possible points. Green building design process dictates the involvement of all project participants from early design phase to the construction, occupancy, and eventually operation what is called in LEED literature “integrative process”. There is also a category with this name having one prerequisite (for healthcare buildings) and one credit (1 point) in Building Design and Construction (BD+C) rating. This category will also be reviewed as it gives score for projects, which conduct an early analysis of energy-related systems (USGBC, 2019a).

Integrative process credit supports interdisciplinary work among project team members and other participants with the aim of designing and constructing a green building with low cost but which is highly efficient. Integrative design services support and strengthen the green building industry and supply chain helping the market transformation from conventional building practices to modernized multi-attribute sustainable construction (Owens, Macken, Rohloff, & Rosenberg, 2013).

To go deep in designing an energy efficient, comfortable and operable building, "Energy and Atmosphere" category credits are introduced in LEED. LEED v4.1 requires projects to follow regulations of standard ASHRAE 90.1-2016 to be eligible for meeting the Minimum Energy Performance" prerequisite and further improvement for optimizing energy

performance. The standard specifies details of the performance-based approach and energy modelling procedures and recommended tools to use (Chen, Lee, & Wang, 2015). According to the standard a baseline or in other words reference building is presented which design case building should show improvement in areas such as building envelope, HVAC system, solar hot water, power and lighting in compare to the baseline building. Among building systems, a priority list determines which one to be completed and improved before the other to accomplish the most cost-efficient and logical way to contribute to green building practices. According to the sequence of importance, the list is as follows:

- To reduce energy demand taking advantage of architectural features and passive design strategies,
- Improvement of mechanical and electrical equipment efficiency,
- To use renewable energy production resources to offset building's energy use (Pauwells, 2017).

The features of the baseline building, which is named as baseline criteria, differ according to architectural mechanical and electrical design decisions, building program, occupancy schedules, and location choices. Climate zone is one of the criteria determined by the project location classified by heating and cooling degree-days. Climate zones are as follows: very hot-humid/dry; hot-humid/dry; warm-humid/dry; mixed-humid/dry; mixed-marine; cool-humid/dry/marine; cold-humid/dry; very cold; and subarctic. The design subjects that are based on climate zones, define decisions about indoor design conditions, the maximum allowed heat transfer coefficients and shading coefficient for different opaque elements, the maximum allowed window-to-wall ratio, and the air-conditioning system characteristics and performance (Chen et al., 2015).

It is also important to track the actual usage when the building is occupied as much as to design an energy efficient building for the reason the building's energy performance is strongly related to the operation stage. In order to make sure energy is consumed as it is assumed in the design phase, LEED introduces one prerequisite and one credit: Building-Level Energy Metering and Advanced Energy Metering. In LEED v4.1, a further improvement named ARC platform, which analyses and shares the real-time data drawn from different sources; such as energy, emissions, water, waste, transportation, and human experience has become engaged to LEED v4.1 Operations and Maintenance (O+M) and LEED for Cities and Communities. To this end, it will be accessible for every green building volunteer to manage, measure, analyse, score and communicate for benefits of both humans and environment (“About ARC,” n.d.).

Commissioning which is a concept first used in shipbuilding industry to make sure that the ships are ready to depart, is defined as "quality-oriented process for achieving, verifying and documenting whether the performance of a building's systems and assemblies meet defined objectives and criteria" (American Society of Heating Refrigeration and Air-Conditioning Engineers, 2015). As a quality control process for the design, construction and operation of buildings, commissioning has started to be applied in the 1970s concurrently with the environmental movement. Throughout the following two decades, it has been more popular especially in public building construction projects. Committees like ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) and the California Commissioning Collaborative published guidance to perform commissioning process in the building sector. Starting from the 90s the process became mandatory for construction contracts of some Federal organizations including The US Government Services Administration (GSA), the Navy Facilities Acquisition Command (NAVFAC), and the US Army Corps of Engineers (USACE). Another factor that promoted commissioning to be involved in the industry that LEED introduced one prerequisite: Fundamental Commissioning and Verification and one credit: Enhanced Commissioning in the rating system which has been taken one step further with the standard upgrade to be applied in v4.1 (Coyner & Kramer, 2017; Milesi, Miyata, & Baumann, 2018). Demand response can be simply defined customer disposed change of electricity use patterns in order to regulate the excessive load on the grid system. In LEED v4.1 the credit is renamed as "Grid Harmonization. Implementing load shifting and shedding procedures on peak demand periods LEED aims "to make energy generation and distribution systems more efficient, increase grid reliability, and reduce greenhouse gas emissions" (Green Building Education Services, 2014; USGBC, 2018a)

Refrigerant management strategy stands for LEED in one credit and one prerequisite, banning using CFC based refrigerants or guiding phasing out procedures of refrigerants, which has a high contribution to ozone depletion and global warming.

What is new in LEED v4.1? - Comparison of energy-based credits of v4 and v4.1

Starting from March 2018, USGBC has published beta versions of rating systems including Building Design and Construction (BD+C), Interior Design and Construction (ID+C), Operation and Maintenance (O+M), Homes and Residential, Cities and Communities before a complete launch of v4.1. After the feedback is compiled from the real world application it will be presented for public comment, followed by a

member ballot and the changes will be made on drafts whenever necessary (USGBC, 2019a).

This study tries to make a detailed comparison of three building scale schemes of LEED: BD+C, ID+C, and O+M.

LEED BD+C v4 vs. LEED BD+C v4.1

LEED recommends the concerns related to energy systems of building starts with early in design where Integrative Process credit ask design teams perform energy-related analysis and improvements on design. Best practice to explore synergies, cost impacts across interrelated systems, and put forth the assumed energy loads and the strategies to be followed to reduce them is to model the building in a level called "simple box". In preliminary energy model below strategies should be assessed:

- Site conditions
- Massing and orientation
- Basic envelope attributes
- Lighting levels
- Thermal comfort ranges
- Plug and process load needs
- Programmatic and operational parameters

The difference between v4 and v4.1 is the number of strategies that it asks for assessing. While v4 requires at least two of the strategies to be assessed, v4.1 asks for all of them (Santosa, 2019; USGBC, 2019a, 2019b). Table 1 shows credit by credit comparison of all changes made to develop LEED v4.1 BD+C NC in integrative process category.

Table 1: Benchmarking LEED BD+C v4 and v4.1 integrative process category credits

	Points	**Name of the prerequisites & credits**	**Description**
LEED v4 BD+C	0	Integrative Project Planning and Design	Applies to healthcare buildings.
	1	Integrative Process	In order to document the process a worksheet is completed. It is also indicated how the analysis informed OPR and BOD. Energy-related systems are inspected at least in two subcategories.

LEED v4.1 BD+C	0	Integrative Project Planning and Design	No change.
	1	Integrative Process	In order to document the process a project team letter is developed. Implementations in site selection, social equity, and health & well-being are rewarded with exemplary performance point. Energy-related systems should be inspected in all subcategories.

The most critical change of v4.1 is the baseline standard which the building systems and efficiency measures are built upon. To respond the market needs and support for the energy code development, instead of an incremental update to ASHRAE 90.1 2013 from ASHRAE 90.1 2010, LEED preferred to adapt the latest version ASHRAE 90.1 2016 (Santosa, 2019). LEED has been criticized for being inexpert to make comparisons of energy consumption of buildings located in various places or constructed in different years for the reason it is based on cost of energy, not the EUI (energy unit intensity), the energy usage of the building per m2. Until the release of v4.1, it was the case for v4 as well (Komurlu, Arditi, & Gurgun, 2014). LEED responded updating the metrics of energy including both energy cost and greenhouse gas emissions. LEED v4 was calculating the annual energy cost budget expecting a percentage improvement for design building over the baseline case while forbidding the possible renewables' contribution calling it "efficiency first" aspect, unlike v4.1. In v4.1 it is permitted that the on-site renewable energy can be added to calculations to comply with Minimum Energy Performance prerequisite (Santosa, 2019; USGBC, 2019a, 2019d, 2019b). As a way of showing commitment to offsetting greenhouse gas effects, new version addressed diverse methods of renewable energy procurement considering market refreshment and support related to renewables. In table 2 five ways of achieving points for Renewable Energy credit is listed according to the percentage weightings (Santosa, 2019; USGBC, 2019a).

Table 2: Types of renewable energy production and procurement in LEED BD+C v4.1 (USGBC, 2019a)

Points	**On-Site Renewables**	**New Off-Site Renewables**	**Existing Off-Site Renewables**	**Green-e Certified:EACs & carbon offsets**	**EACs & carbon offsets**
1	2%	20%	60%	100%	150%
2	6%	40%	80%	200%	
3	15%	60%	100%	300%	
4	35%	80%			
5	60%	100%			
EP	100%				

In v4.1, "Demand Response" credit name changed into "Grid Harmonization" to emphasize grid-scale efforts of buildings depleting CO2 in the atmosphere. New option added to the credit rewards project teams for applying load flexibility and management (USGBC, 2019a).

Among all critical changes regarding the category, the main modification, which can be observed through all other categories as well, is making credits more applicable and achievable internationally. Appendix A shows credit by credit comparison of all changes made to develop LEED v4.1 BD+C in energy and atmosphere category.

LEED O+M v4 vs. LEED O+M v4.1

LEED v4.1 classifies the spaces that it applies as existing buildings and interiors while in LEED v4 similar to BD+C rating system there are plenty of building types: existing buildings, schools, retail, data centres, hospitality, warehouses, and distribution centres and multifamily.

To make sure LEED can address the issues that green building community faces all over the world alternative compliance paths to perform the energy audit accordingly - EN 16247-2.2014 - are added in v4.1 especially for projects in Europe.

Some prerequisites and credits are removed, and their intended outcomes are compiled in new credits or presented as best practices in Energy Performance credit to achieve the intended energy efficiency target. Appendix B shows the credits that still exist and are removed.

Energy efficiency measures are updated in LEED v4.1 O+M just like in BD+C rating adding a "performance score" which is calculated by two sub-scores: A Greenhouse gas emissions score and source energy score. Greenhouse gas emissions as a contribution to climate change and the building's energy efficiency are measured in these two metrics. In LEED v4, project teams were only required to document the energy efficiency strategies; but in v4.1, the bar is raised asking for a detailed analysis of reducing the actual energy use of the building with benchmarking methods. Both rating systems give a mandatory energy efficiency score: in v4, it is 75 ENERGY STAR score; in v4.1, it is performance score of 13. V4 categorizes the buildings in two cases: buildings eligible for using EPA ENERGY STAR's Portfolio Manager Tool and buildings that are not eligible. The ones that are not eligible can be benchmarked between buildings with the same uses via national average source energy data or historical data when national average source energy data is not available. In v4.1, it is not described what to do when actual energy use of the building cannot be determined.

Demand Response credit is renamed as Grid Harmonization like in BD+C rating. Intentions of the changes are the same which can be

summarized as making energy generation and distribution systems more efficient, increasing grid reliability, and reducing greenhouse gas emissions (USGBC, 2018a, 2018b).

LEED ID+C v4 vs. LEED ID+C v4.1

Regarding the documentation of Integrative process and new strategies created for achieving exemplary performance point are aligned with BD+C rating system. One of the specific changes applies to interior design projects is recalling an old credit from v2009. The credits were rewarding projects that prefer to build their interior outfits in a certified building to promote green building benefits.

Standard upgrade from ASHRAE 90.1-2010 to ASHRAE 90.1-2016 for energy-related requirements is also in effect for ID+C rating. The changes for energy efficiency measures, Demand Response, Renewable Energy Production credits are the same with BD+C rating (USGBC, 2019c, 2019e). Appendix C shows credit-by-credit comparison of the changes made to v4.1.

Considering all the changes regarding "Energy and Atmosphere category, the most radical one is energy efficiency metrics which is transformed from annual energy cost method into two: greenhouse gas emissions and cost. Appendix D shows a general comparison of main features of energy-related aspects of the rating system version, BD+C New Construction.

DISCUSSION AND CONCLUSION

In this paper, LEED's understanding of improvement on the energy performance of buildings is reviewed in two categories -Integrative Process and Energy & Atmosphere- by credit intent and requirement review. As it is given the highest share of points among other categories, LEED emphasizes the energy-related strategies essentiality while reaching environmental, economic and human-centred objectives of green buildings.

Revealing the energy-related category changes from v4 to v4.1 in three schemes of LEED- BD+C, ID+C, O+M- in building scale it is attempted to clarify what has worked, what hasn't and also what might work regarding to have an energy efficient comfortable building for environmental professionals and building sector actors including architects, engineers, stakeholders, occupants, etc.

On Appendix D Table A4 general comparison of energy related changes regarding LEED BD+C is shown. Besides, the other building scale schemes do not comprise major difference in terms of energy related approaches of new version. Thus, BD+C rating is selected not to cause a

repetitive explanation. When energy related principles are observed under defined indicators on the table:

- **Assessment method** became a more solid, approach including greenhouse gas emissions calculations to the energy usage data when dealing with over-consuming effects of building industry. New method enabled observing the data according to different locations and date periods of built environment.

- **Simulation tool** is defined under a standard, supporting standard improvements related to environmentally responsible design and technologies

- **Scope of assessment** commits a more detailed systematic and more options.

- Percentage decrease on **min** and **max credit level performance criteria** implicates the difficulty to achieve the new regulations of PCI calculation.

- **Baseline case** asks for no improvement over the standard in new version. Thus, LEED supports mandatory standards to be met for green building practices.

- Percentage of **energy related credits/points** remain the same, which shows consistent importance given to energy usage of buildings.

As of today, projects certified under BD+C NC is approximately 2,5 times more than that are certified under O+M in LEED rating. This case is mostly determined by difficulties to track the usage of energy sources and enhancing it in existing buildings. As the diminishing resources of the earth, pollution of air and water and change of climate gives an emergency alarm it is obvious that construction of new buildings even in green policies is not more sustainable than reusing the existing ones. With this awareness, LEED gives the biggest importance to O+M rating system, as it is the first released the beta registration process for O+ M certification.

Integrative process that is introduced as a must for green building management process is indeed not an invention for getting buildings certified as green but a modernized effective and comprehensive approach that should be engaged with BIM technology to be adapted in building design construction and operation sectors. In the latest version, integrative process is still presented as a desired way of design and build. However, the critical path to reaching a well-established systematic is not demonstrated.

There are studies, which prove that certified buildings may not perform in terms of energy use as it is intended as they are designed or show a notable percentage of failure in compare to non-certified buildings. Most common reasons that building actual energy performance does not match the design

case are an improper adaptation of operation stage by the users or facility managers, untrained construction personnel, failure in commissioning, inadequate tracking, and reporting the energy usage data. To calculate, track, and optimize energy usage in existing buildings are much more challenging when compared to new buildings. Nevertheless, new version of LEED O+M does not seem to improve those phases of green building profession, as Existing Building Commissioning - Analysis, Existing Building - Implementation and Ongoing Commissioning credits are removed and became a recommended path for better operations of an energy efficient building.

For the occupants, the green building education is crucial as the aim of building green is only fulfilled when it performs according to the forecasted savings of water and energy. Although education for green operation strategies takes place as an innovative approach in LEED, it still does not get the emphasis deserved in new rating, v4.1.

Commissioning procedure, which is a mandatory regulation for some organizations in the US and other countries, is given much importance in LEED as well. However, LEED v4.1 took it a step further engaging ongoing performance tracking platforms and sharing real-time data with the public.

It is understandable that one of the most influential drivers of growing green building economy is the pursuit of the prestige of stakeholders by getting their buildings certified. Although market competition is not a restricted method, it holds the possibility of getting pseudo green buildings instead of achieving real energy savings. The main task here should be assigned to green building consultants who are called accredited professionals in LEED literature taking the responsibility of managing green strategies, bringing together the project professionals and helping streamline the process of certification. APs should be involved more actively in all types of building construction and the demand for employment of these professionals should be increased.

The most powerful change can be accomplished by governments, which heed life-cycle consideration over enforcement of the capital economy in building industry promoting greener economy and engaging voluntary certification system to mandatory building codes.

Another challenge in expanding and achieving the LEED certification system is the lack of guidance on how to pick and earn related credits which best suits your type of buildings and/or location. Time and effort spent on finding the reasonable credits to achieve is huge. This shows that there is a need for a connector to serve as a guide between LEED and users. Guidance tools can be software that provide guidance for LEED credits, or platforms where real project management experiences are shared.

A building, which is energy efficient and considers user comfort is only possible when the architectural design decisions such as orientation, envelope features and façade layout are designed properly and applied successfully. Otherwise, no mechanical or electronic system will be sufficient to make a building energy efficient.

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Appendix A. Table A1: Benchmarking LEED BD+C v4 and v4.1 "Energy and Atmosphere" category credits

LEED v4 BD+C			LEED V4.1 BD+C		
Points	**Name of the prerequisites & credits**	**Description**	**Points**	**Name of the prerequisites & credits**	**Description**
0	Fundamental Commissioning and Verification	ASHRAE Guide 0-2005 and for enclosure of building NIBS Guide 3-2012 are used.	0	Fundamental Commissioning and Verification	ASHRAE Guide 0-2013 is used. Commissioning of the envelope should be performed according to OPR and BOD. ASTM E2947-16 can be additional support for the unsolved issues.
0	Minimum Energy Performance	ASHRAE 90.1-2010 standard is the baseline reference. Energy efficiency is calculated according to the annual energy bills. 3 options are defined. Option 1: Building energy simulation, option 2: Compliance with ASHRAE %50 Advanced Energy Design Guide, option 3: Compliance with Advanced Buildings Core Performance Guide. For option 1 projects must demonstrate 5% more energy efficient design for NC.	0	Minimum Energy Performance	ASHRAE 90.1-2016 is the baseline reference. To access the targeted performance defined in ASHRAE, energy cost calculations, greenhouse gas emissisons and on-site renewable energy resources can be used. No additional performance is expected for the compliance other than the standard.
0	Building-Level Energy Metering	Applies to all building types defined under BD+C rating.	0	Building-Level Energy Metering	No change
0	Fundamental Refrigerant Management	Applies to all building types defined under BD+C rating.	0	Fundamental Refrigerant Management	No change
6	Enhanced Commissioning	Consists of two options: enhanced systems commissioning and envelope commissioning.	6	Enhanced Commissioning	Changes made to Fundamental Commissioning also applies to this credit. Consists of two options: enhanced systems commissioning and envelope commissioning.
18	Optimize Energy Performance	Consists of two options. Option 1: Whole building energy simulation, option 2: Prescriptive compliance using ASHRAE Advanced Energy Design Guide.	18	Optimize Energy Performance	Consists of 4 options. Option 1: Energy Performance Compliance . Option 2: Prescriptive compliance with the associated guide. Option 3: Systems Optimization. Option 4: System Optimization for data centers
1	Advanced Energy Metering	Applies to all building types defined under BD+C rating.	1	Advanced Energy Metering	No change
1	Enhanced Refrigerant Management	Applies to all building types defined under BD+C rating.	1	Enhanced Refrigerant Management	No change
2	Demand Response	Case 1 and 2 is defined. Case 1 is applied when there is an existing demand response program at the site, case 2 is the preperation of infrustructure for future demand response programs.	2	Grid Harmonization	The name “Demand Response” is changed to “Grid Harmonization”. Demand response program should be added to building systems manual. As an addition to case 1 and 2 ,case 3 is defined : Load Flexibility and Management Strategies.

3	Renewable Energy Production	With on-site renewable energy production it is aimed to offset building greenhouse gas emissions. The project should own or lease the system for at least 10 years.	5 Renewable Energy	With self-supply of renewable energy and the use of grid-source, renewable energy technologies and carbon mitigation projects it is aimed to offset To reduce the environmental and economic harms associated with fossil fuel energy and reduce greenhouse gas emissions The project should own or lease the system for at least 15 years.
2	Green Power and Carbon Offsets	It is a five year contract for financial investment in 50% or 100% of the buildings electricity from green power, renewable energy certifcates, or carbon offsets.		

Appendix B. Table A2: Benchmarking LEED O+M v4 and v4.1 "Energy and Atmosphere" category credits

LEED v4 O+M			LEED V4.1 O+M Existing Buildings			LEED V4.1 O+M Interiors		
Points	**Name of the prerequisites & credits**	**Description**	**Points**	**Name of the prerequisites & credits**	**Description**	**Points**	**Name of the prerequisites & credits**	**Description**
0	Energy Efficient Best Management Practices	For energy audit reference standard is ASHRAE Procedures for Commercial Building Energy Audits	0	Energy Efficient Best Management Practices	For energy audit reference standard is ASHRAE Procedures for Commercial Building Energy Audits and EN 16247-2:2014 for projects in Europe.	0	Energy Efficient Best Management Practices	Added improvements to make it more applicable for interior projects
0	Minimum Energy Performance	2 cases are defined. Case 1: ENERGY STAR rating. Case 2: Projects Not Eligible for ENERGY STAR Rating. For case 1 min score of 75 is required. For case 2 benchmarking can be performed between typical buildings or if N/A with historical data.						
0	Building Level Energy Metering	It is required to compile building-level meter data and share it with USGBC for 5 years.						
0	Fundamental Refrigerant Management	No use of CFCs or a phase-out plan to be completed within 10 years.	0	Fundamental Refrigerant Management	No change	0	Fundamental Refrigerant Management	No change
2	Existing Building Commissioning-Analysis	Consists of 2 options. Option1: Existing Building Commissioning. Option 2: Energy Audit						
2	Existing Building Commissioning-Implementation	Additional implications to achieve credit EBC-Analysis such as training, tacking and verification program, operations and maintenance plan etc.						

3	Ongoing Commissioning	Includes planning, point monitoring, system testing, performance verification, corrective action response, ongoing measurement, and documentation to proactively address operating problems in the systems being commissioned.						
20	Optimize Energy Performance	Projects earn points by documenting strategies to improve energy efficiency. ENERGY STAR performance rating is used.	33	Energy Performance	Projects annual energy use is measured. The data is used for calculating an energy performance score which is measured by two metrics: greenhouse gas emissions and source energy. Commissioning o LEED v4 O+M EA prerequisite Existing Building Commissioning—Analysis o LEED v4 O+M EA credit Existing Building Commissioning—Implementation o LEED v4 O+M EA credit Ongoing Commissioning } LEED v4 O+M EA credit Advanced Energy Metering } LEED v4 O+M EA credit Demand Response } LEED v4 O+M EA credit Renewable Energy and Carbon Offsets credits of v4 are recommended to improve performance score of the building.	33	Energy Performance	Install sub-meters to measure consumption for electricity and fossil fuel equipment included in the project scope or establish a process for pro-rating energy use based on occupancy and base building energy use.
2	Advanced Energy Metering	Advanced meters are to be installed for measuring whole-building energy sources and major end uses that represent 20% or more of the total annual consumption of the building minus plug load use.						

3	Demand Response	3 cases are defined. Case1: Demand response program available. Case 2: Demand response program not available. Case 3: Permanent load shifting	1	Grid Harmonization	3 cases are defined. Case1: Demand response program available and participation Case 2: Demand response capable building. Case 3: Permanent load shifting technologies. For case 1 on peak demand period is further defined. For case 2 it is emphasized that DR plan must be a part of the building commissioning plan. For case 3 eligible technologies are defined.				
5	Renewable Energy and Carbon Offsets	Meet the whole or a part of the building's energy use with renewables production or procurement.							
	Enhanced Refrigerant Management	Consists of 2 options. Option1: No Refrigerants or Low-Impact Refrigerants. Option 2: Calculation of Refrigerant Impact	1	Enhanced Refrigerant Management	No change	1	Enhanced Refrigerant Management	No change	

Appendix C. Table A3: Benchmarking LEED ID+C v4 and v4.1 "Energy and Atmosphere category credits

LEED v4 ID+C			LEED V4.1 ID+C		
Points	**Name of the prerequisites & credits**	**Description**	**Points**	**Name of the prerequisites & credits**	**Description**
0	Fundamental Commissioning and Verification	Cx referenced standard is ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1–2007 for HVAC&R Systems.	0	Fundamental Commissioning and Verification	Cx referenced standard is ASHRAE Guideline 0-2013 and ASHRAE Guideline 1.1–2007 for HVAC&R Systems Requirements for exterior enclosures are defined and ASTM E2947-16 standard is added for guidance.
0	Minimum Energy Performance	ASHRAE 90.1-2010 standard is the baseline reference. Energy efficiency is calculated according to the annual energy bills. 2 options are defined. Option 1: Tenant-Level Energy Simulation, option 2: Prescriptive Compliance with ASHRAE 90.1-2010. For option 1 projects must demonstrate 3% more energy efficient design.	0	Minimum Energy Performance	ASHRAE 90.1-2016 is the baseline reference. To access the targeted performance defined in ASHRAE, energy cost calculations, greenhouse gas emissions and on-site renewable energy resources can be used. No additional performance is expected for the compliance other than the standard.
0	Fundamental Refrigerant Management	Applies to Commercial Interiors, Retail and Hospitality defined under ID+C rating.	0	Fundamental Refrigerant Management	No change
5	Enhanced Commissioning	Consists of two options: enhanced commissioning and monitoring-based commissioning.	5	Enhanced Commissioning	Changes made to Fundamental Commissioning also applies to this credit. Consists of two options: enhanced commissioning and monitoring-based commissioning.

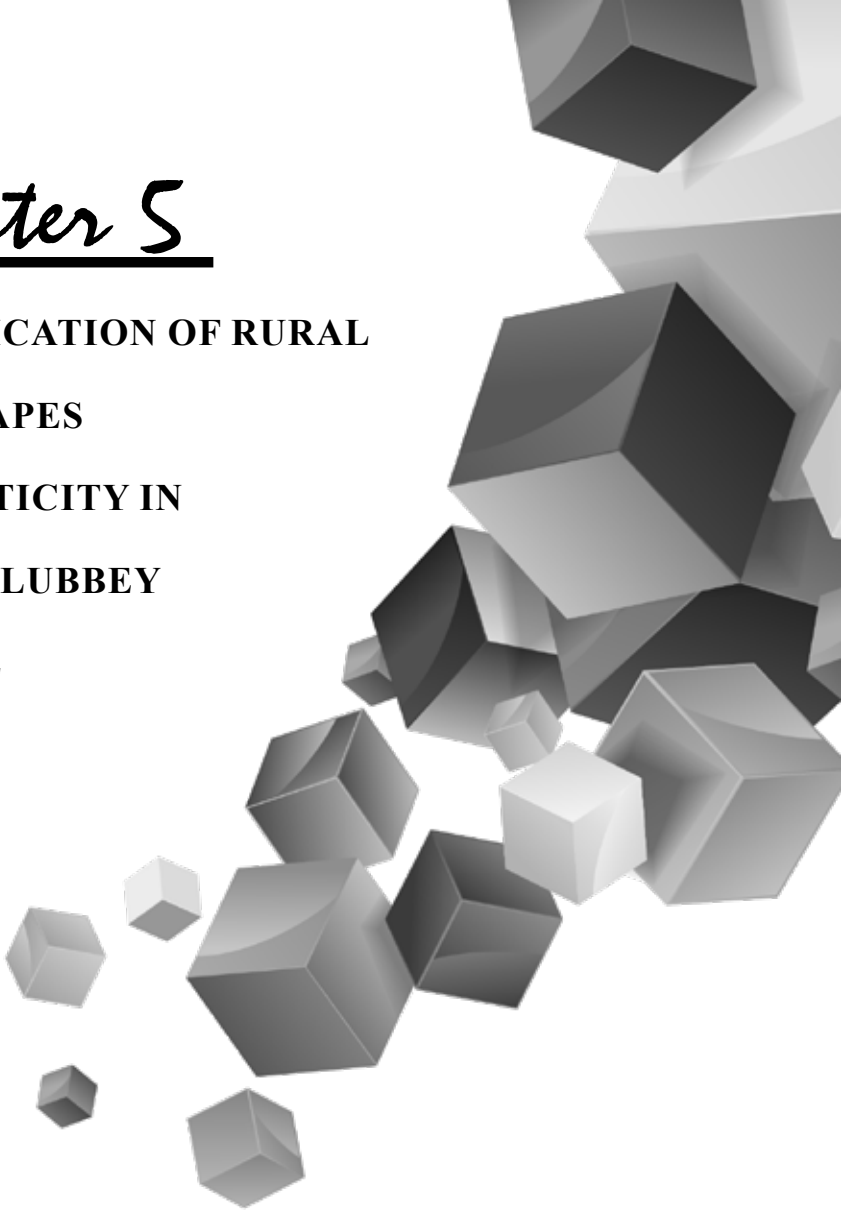
25	Optimize Energy Performance	Consists of two options. Option 1: Tenant-Level Energy Simulation. Option 2: Prescriptive Compliance.	24	Optimize Energy Performance	Consists of 2 options. Option 1:Tenant-Level Energy Performance Compliance. Option 2: Prescriptive Compliance. Efficiency measures are split into metric of cost and GHG emissions. For option 2 building systems are divided into two as base building systems and tenant systems and points are redistributed accordingly.
2	Advanced Energy Metering	Applies to Commercial Interiors, Retail and Hospitality defined under ID+C rating.	2	Advanced Energy Metering	No change
1	Enhanced Refrigerant Management	Applies to Commercial Interiors, Retail and Hospitality defined under ID+C rating.	1	Enhanced Refrigerant Management	No change
3	Renewable Energy Production	With on-site renewable energy production it is aimed to offset building greenhouse gas emissions. The project should own or lease the system for at least 10 years.	5	Renewable Energy	With self-supply of renewable energy and the use of grid-source, renewable energy technologies and carbon mitigation projects it is aimed to reduce the environmental and economic harms associated with fossil fuel energy and reduce greenhouse gas emissions. The project should procure existing off-site renewables, EACs and carbon offsets from projects that have come online or been built within the last 15 years, it is 10 years for all off-site qualifying resources.
2	Green Power and Carbon Offsets	It is a five year contract for financial investment in 50% or 100% of the buildings electricity from green power, renewable energy certifcates, or carbon offsets.			

Appendix D. Table A4: General Comparison of LEED Building Design and Construction - New Construction v4 and v4.1

Item	LEED v4 BD+C NC	LEED v4.1 BD+C NC
Assessment method	Options of feature-specific criteria and energy cost budget method	Options of feature-specific criteria and performance cost index calculations
Simulation tool	DOE-2 based modeling programs: HAP, TRACE, Energy-10, Energy Plus, TRNSYS	ASHRAE Standard 209 is recommended to make an energy model of the building
Scope of assessment	Efficiency of building systems performing an energy simulation of the building demonstrating a percentage improvement in terms of energy cost budget, prescriptive compliance using the applicable guides.	Efficiency of building systems demonstrating a performance cost index below the target in the standard using metrics of cost and green house gas emissions and renewable energy resources, prescriptive compliance using the applicable guides or system optimization.
Max. credit level performance based criteria	Reduction of 54% in annual energy cost over the budget is awarded with exemplary performance	% 50 improvement by cost PCI below PCIt and % 100 Greenhouse Gas Emissions PCI below PCIt is awarded with exemplary performance
Min. credit level performance based criteria	Reduction of 6% in annual energy cost over the budget	5% improvement of PCI below the PCI t using metrics of cost and GHG emissions. Total points have been divided equally between the metrics of energy cost.
Baseline case/zero credit level	Reduction of 5% from ASHRAE 90.1-2010 requirements in annual energy cost over the budget is the prerequisite	Compliance with ASHRAE 90.1-2016 standard choosing one of three paths.
Energy-related credits/points (%)	30	30

Chapter 5

IDENTIFICATION OF RURAL LANDSCAPES AUTHENTICITY IN ODEMIS, LUBBEY VILLAGE



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Introductions

Cultural landscape is a combination work of man and nature and important part of our cultural heritage. By 1992 World Heritage Convention has become an international instrument to recognize and protect cultural landscapes. Great variety of cultural and natural elements as well as tangible and intangible in the landscape comprise different typologies such as clearly defined, organically evolved or associative cultural landscape. Within the scope of cultural landscapes, rural landscapes play an important role in urban and agricultural classification. Rural landscapes are living spaces that consist of many authentic elements. However, the landscape consisting of a village and agricultural land forms the basis, and approaches are shaped around this perception.

Authenticity is defined as originality, genuineness or entity which refers to the quality or condition of being authentic, trustworthy or genuine which help as to identify and understand the value inherited within the cultural landscapes. Character of the landscape is seen as an embodiment of traditions, customs and aesthetic qualities of historical and cultural heritage. Cultural, ecological and spiritual values that people attached the landscape can be regarded key elements of authenticity and also indicator outstanding universal values. Some of the criteria have already adopted in the definition of world heritage cultural landscapes are to bear a unique or exceptional testimony of cultural traditions, architectural product or traditional human settlement, ideas, beliefs with artistic and literary works of significance. Each culture, society, time place and land has its own authentic aspect that can be unique and exceptional for the rest of the world.

Depending on the cultural heritage, its cultural context and evolution in time, authenticity judgments could be linked to the worth of a great variety of information as UNESCO Nara Document. Authenticity involves with tangible and intangible attributes of a heritage and can be found both natural and human created elements in the landscape. Depending on the land, time and content; authenticity can be one of the appropriate interventions in understanding the values that are critical for heritage and landscape conservation.

The aim of this paper is to discuss how authenticity can be used as a tool to understand rural landscape values in Lübbey village. Different typologies of Lübbey village's rural landscape will be evaluated with regard to their authentic and outstanding values. Lübbey village's authenticity will be analysed regarding to its form and design, material and substance, use and function, traditions and techniques, location and setting, spirit and feeling. This research will provide an alternative approach to understand and appreciate outstanding values in rural landscapes which strongly evolved with their authentic characters and greatly contribute to the

preservation, management and promotion of rural landscapes stimulating their cultural, social, territorial and touristic significance in landscape conservation as well.

Findings

Cultural and Rural Landscape

Landscape means an area and results from combinations of many factors, both natural and cultural, which have developed over the course of time in line with individual geographical considerations. These factors continue to shape the landscape through a dynamic process, viewed by man in a variety of ways, depending on whether he is participant or spectator. It is not possible to separate the concepts of "cultural landscape" and "natural landscape" as they are both extremely closely interrelated (Lebeau, 2002).

Cultural landscapes define the human society evolution and settlement over time, under the affect of the physical limitations and opportunities presented by their natural environment and of successive social, economic and cultural forces.

Within the scope of cultural landscapes, landscape is constantly changing in urban and rural areas. This change should be taken into account in landscape definitions. In other words, landscape character definitions should be made spatially and temporally. According to Aran (1975); "Rural landscape is the view of the environment in which the activities of human beings other than urban purposes in nature. These activities can be mainly agricultural, industrial, recreative or forestry oriented "(Gül, 2000).

Villages are simply the smallest settlement where people live together, which are important part of rural landscapes. The appearance of the villages, where the tradition is predominantly dominated, has a long history in our country as well as in the world (Eldem, 2015).

Lübbey village is one of the authentic rural landscape areas that should be protected with its cultural landscape features, is selected as reserach area. As a result of the research, the unique cultural landscape features of the Lübbey village, which carries the traces of history from past to present, were evaluated within the framework of the authenticity criteria in the UNESCO Nara authenticity document and the importance of the values it possessed in the regional and national landscapes was revealed.

Authenticity

Authenticity is the degree to which one is true to one's own personality, spirit, or character, despite the pressures of external and internal factors which also can be defined as term of "originality, self". According to Stovel (2004), authenticity is a "measure of the degree to which the values

of a heritage property may be understood to be truthfully, genuinely and credibly, expressed by the attributes carrying the values".

"Authenticity" is key concept in the World Heritage Convention and is critical to discussions of threats to World Heritage sites. The convention requires that "to be deemed of outstanding universal value, a property must meet the conditions of authenticity and must have an adequate protection and management system to ensure its safeguarding" (WHC, 2008).

The concept of authenticity is not easy to define. In particular, authenticity is socially constructed, so it has different meanings in different cultural contexts. This brings certain problems associated with enforcing common standards, but it also offers flexibility in taking the characteristics of each individual site into consideration when making preservation decisions. Temporal change is not the only influence on authenticity. The World Heritage program also accepts that different cultures interpret the concept in different ways (Labadi, 2007) and it has convened several conferences to discuss such ambiguities. The first and most significant of these, the Nara Conference on Authenticity in 1994, gave rise to The Nara Document on Authenticity, which outlines how the term "authenticity" should be interpreted. "Cultural heritage diversity exists in time and space, and demands respect for other cultures and all aspects of their belief systems". Authenticity of cultural heritage must, therefore, be judged in its own cultural context. (WHC, 2008). Since the Nara Conference, UNESCO has convened several regional meetings to develop these local understandings of authenticity, including a European conference in the Czech Republic in 1995, an inter-American symposium in Texas in 1996, and an African meeting in Zimbabwe in 2001 (Alberts & Hazen, 2010).

According to cultural heritage type and context, properties may be understood to meet the conditions of authenticity if their cultural value are properly and credibly expressed through the features variety including (UNESCO, 2005; Stovel, 2007) form and design, materials and substance, use and function, traditions, techniques and management systems, location and setting, language, and other forms of intangible heritage, spirit and feeling and other internal and external factors.

Historical development process and the place at international commisions of authenticity

- The Nara Authenticity Conference was held in 1994 in Nara, Japan, with the proposal of the World Heritage Committee and the cooperation of UNESCO, ICCROM and ICOMOS.

- In these meetings, the committee expressed its willingness to implement a concept of authenticity that respects the cultural and social

values of all countries during the examination of the files of cultural assets proposed to join the World Heritage List.

- The Nara Certificate of Authenticity was designed inspired by the Venice Charter 1964. It constitutes a conceptual extension of it based on this regulation, and today takes into account the important place of cultural heritage in almost all societies.

- In a world that faces the pressure of globalization and uniformity and where the search for cultural identity is sometimes pursued through an aggressive nationalism and the ignoring of minority cultures, the greatest contribution to the protection of cultural heritage is to respect and enlighten all aspects of humanity's common memory.

- The Nara Certificate of Authenticity was written by 45 participants of the Nara Certificate of Authenticity Conference held in Nara, Japan on November 1-6, 1994.

- With the Nara Certificate, the definitions of protection, sources of information, integrity and originality were mentioned; it is envisaged that a heritage value should be recognized by considering the nature, characteristics, history and meaning and by avoiding strict standards, ensuring its material protection, and evaluating it when necessary.

Authenticity in Rural Landscapes

The permanent protection of the cultural, rural landscapes and heritage are of the highest importance to the international community as a whole. The Committee defines the criteria for the inscription of properties on the World Heritage List. According to World Heritage Convention, the following would be considered as "cultural heritage" (WHC, 2011).

Monuments architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, art or science;

Groups of buildings groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, art or science;

Sites works of man or the combined works of nature and of man, and areas including archaeological sites which are from the historical, aesthetic, ethnological or anthropological points of view.

Within the UNESCO Nara Document (1994), outstanding universal value of world heritages were mainly proved. Different criteria were particularly evaluated with this document. At this point monuments, groups of buildings and sites groups and their subgroups are not only

determined of their outstanding universal value with tangible properties but also intangible properties.

Outstanding Universal Value outlines cultural landscapes aspects for consideration in the justification of claims against the World Heritage Criteria and how the authenticity of a nomination can be interpreted for cultural landscapes.

The recognation of cultural landscapes as a form of heritage contributed to a shift within the historic-preservation field that broadened the definiton of heritage to incorporate a wide range of tangible and intangible expressions of culture. The heritage values of cultural and rural landscapes often include cultural traditions, intergenerational use and continuity, socioeconomic systems and the natural environment; consequently, landscapes are characterized by both cultural and ecological change. Elements that characterize many landscapes, such as vegetation and ecosystems, as well as certain types of built features, are emphemeral and subject to change over time. Also many cultural and rural landscapes are places of living heritage with intangible values, and many are shaped by traditional land-use practices within a larger economic environment (Mitchell, 2008).

The scope of cultural and rural landscapes is very wide and they are discussed in two separate categories which are tangible and intangible.

Tangible cultural heritage includes buildings and historic places, monuments, artifacts, etc., which are considered worthy of preservation for the future. These include objects significant to the archaeology, architecture, science or technology of a specific culture (EU, 2014).

Intangible cultural heritage includes but not limited to traditional festivals, oral traditions, oral epics, customs, ways of life, traditional crafts, etc. (EU, 2014).

Convention for the Safeguarding of the Intangible Cultural Heritage UNESCO Genereal Conference was adopted a large majority of votes on 17 October 2003 in 32. General Assembly. The first purpose of this convention is to safeguard the intangible cultural heritage (UNESCO, 2003)

Both cultural tangible and intangible heritages are important sources with pass from generation to generation, interactions with nature and history and provided for their identity, keep alive the consciousness of continuity with the deep-rooted relations with each other. They affect creativity of human beings increasingly and provide to define “authenticity”.

Rural Authenticity in Lübbey Village

Lübbey village is located in İzmir, Ödemiş district, has chosen as the research area (Figure 1). It is located in the valley of Rahmanlar stream, west of Subatan and Ayvacık highlands, one of the north-south

groove-shaped pits on the Bozdağlar plateau in Lübbey. Located in Küçük Menderes basin and living with its inhabitants until 1982, this village has been named as a winter quarters. The local people of the village, who spent their lives in Lübbey highland in the summer until the 1960s, migrated permanently to the Lübbey plateau with the migration process. When the population of Lübbey is examined today, it is seen that the population of the village has decreased rapidly over the past years (Güler, 2016).

Figure 1. *Location of research area (Güler, 2016)*

It was shaped in line with the traditional texture, topographic structure, climatic features, materials available from the close environment and traditional construction techniques in Lübbey village. Local people obtain the stone material they use to build their structures from slate, the wood material from the forests and the mudbrick material from the soil. The structures in the village are positioned as collective settlements suitable for topography, without interrupting each other's view on the sloping land (Güler, 2016) (Figure 2).

The village has organic narrow streets. Other elements that make up the rural landscape with the buildings are the vegetable and fruit gardens surrounding the residences, olive groves, Rahmanlar stream and pine forests. Some of the buildings in the settlement are located alone in the garden and most of them are adjacent to each other (Güler, 2016). Residences and residential gardens, which are an important part of rural landscapes, are important places that are the mirrors of the village culture and reflect the unique rural landscape values of the village.

Figure 2. *Lübbey village (Original, 2020)*

There are some important findings about the history of Lübbey settlement dating back to the Hellenistic period (Kut & Yörür, 2016). Lübbey has some suitable areas for history and cultural tourism, highland tourism, botanical tourism, mountain and hiking tourism. The dense forest texture of Çamyayla is the most important element of nature tourism. The forest area between Horzum highland in the northwest of the highland is the richest area on Bozdağlar in terms of species diversity (Ödemiş Commodity Exchange, 2020).

The population of Lübbey village and Çamyayla were equalized in 1985-1986, the population of Lübbey decreased rapidly after this date, and the population of Çamyayla continued to increase rapidly. Today, 8 people permanently reside in 6 households in Lübbey village, while 414 people live in Çamyayla. There are 52 buildings registered with the mosque in Lübbey village. The mosque was registered with the decision of İzmir II Cultural and Natural Heritage Conservation Regional Board in 2009, and the residential buildings in the village were registered with the decisions of İzmir I Cultural and Natural Heritage Conservation Regional Board in 2016 (Tulek & Saner, 2020).

To understand the value and the right to assess of Lübbey cultural and rural values are important to detection of Lübbey village "authenticity". The authenticity of the area is defined with representation of its unique features which is about interaction between the tangible and intangible values and the dynamic relationship between nature and culture. It will be examined the basis of "authenticity" criteria with the Rössler (2008), Mitchell (2008), Stovel (1994), ICOMOS (1999), Fowler (2002), Morales et al. (2005), Diamant et al. (2007), UNESCO (2007) and Buggey (2008) resources. Lübbey village authenticity criteria are evaluated in Table 1.

Table 1. *Evaluation scale table of authenticity for Lübbey village*

Location and Settlement		**Yes**	**No**
The physical structure of the land	Plain		x
	Light Curved		x
	Curved	x	
	Rolling	x	
	Valley	x	
	Wide Valley		x
Using the site	Traditional residential area	x	
	Traditional agricultural area	x	
	Religious field		x
	Military field		x
	Commercial area		x
	Tourism area	x	
Traditions, Techniques and Management Systems		**Yes**	**No**
Construction techniques	Traditional	x	
	Modern		x
	Ancient		x
	Mixed		x
Uses of historical building	Placement	x	
	Military		x
	Education		x
	Health		x
	Defense		x
	Social events		x
	Commercial		x
	Religious		x
	Union (Lycian Union, Colonial,etc..)		x
Management systems	Kingdom		x
	Dynastic		x
	Imperial	x	
	Monarchy	x	
	Republic	x	
Materials and Objects		**Yes**	**No**
Material types	Concrete		x
	Wood	x	
	Stone	x	
	Metal (aluminum, iron, steel, ..)		x
	Architecture, traditional structures	x	
Objects	Picture		x
	Sculpture		x
	Miniature		x
	Music		x
	Letter		x
Design and Form		**Yes**	**No**

	Balance		x
	Form		x
	Emphasis	x	
	Rate	x	
	Sequence, rhythm, repetition	x	
	Colour		x
	Scale		x
	Function		x
	Union	x	
	Composition	x	
	Usage and Function	**Yes**	**No**
Usage in original form	Residential purpose usage	x	
	Agricultural usage	x	
	Industrial usage		x
	Tourism purpose usage	x	
Usage in new function	From residential usage to touristic usage	x	
	From agricultural usage to		x
	From ındustrial usage to		x
	From touristic usage to.....		x
	From religious usage to touristic usage		x
	Spirit and Expression	**Yes**	**No**
	Emotional effects	x	
	Religious effects		x
	Historical ties	x	
	Sounds, smells and tastes		x
	Creativity		x
	Innovation		x
	Artistic Interactions		x
	Traditional interactions	x	
	Political Interactions		x
Language and Characteristics of Intangible Cultural Landscape		**Yes**	**No**
Language	Turkish	x	
	English		x
	Greek		x
	German		x
	Italian		x
	French		x
	Polish		x
	Arabic		x
	Spanish		x
	Persian		x
Characteristics of intangible cultural landscape	Representations		x
	Performing arts		x
	Social applications: Ceremonies, feasts, festivals, rituals, etc.	x	
	Knowledge and practices are related to nature and the universe		x

Conclusions

Population increases rapidly in the world and land use changes brought about new approaches especially for conservation of cultural landscapes. World Heritage Committee brings a conservation approach to the cultural landscapes with predicted criteria in international level. Cultural landscapes include tangible culture, intangible culture and natural heritage.

In recent years, authenticity and its criteria have been started to discuss for conserving and describing cultural landscapes values. Authenticity is value of a person or area which comes out its unique and different spirit and character properties, transfer of tangible and intangible properties. In this sense, social factors, time factors, spatial factors affect the determination of authenticity. Tangible and intangible characteristics of an area can be determined with authenticity assesments.

Authenticity of cultural and rural landscapes indicate landscape form, design, usage and cultural, social, religious, spiritual values which come from the past to present. In this research, materials, spirit and expressive and qualities of the intangible cultural heritage topics were observed to forward with their authentic values in evaluation scales. Traditional architectural buildings, gardens, mosque, walls, pavements, roads as tangible characteristics; highland festivals, historical ties, traditional interactions as intangible characteristics in the Lübbey village can be determined "authenticity" of the site. Identification, interpretation, evaluation and conservation of the area are great importance to be considered. Traditional settlement texture should be preserved in the village, and restoration works should be carried out in accordance with the authentic structure.

On the other hand, social, political and religious factors effect rural landscape areas' authentic character. For instance; works on touristic activity and income are not enough to conserve of any authentic character. Touristic works on site should be designed on stick by its outstanding and authentic characters.

Exceptional significance of cultural landscape prove with their authentic property. The criteria of authenticity are determined with Nara Document in 1994. When we look at the study area's evaluation scale tables of "Authenticity", Materials, Spirit and Expression and Characteristics of Intangible Cultural Landscape are rised out especially. They are very important to describe, interprate, evaltuate and conserve of Lübbey village outstanding and authentic value.

Landscape Architecture is define as "an art of planning, designing, managing and reparing in natural cultural environment". Rural landscapes

are in Landscape Architecture's study areas. For effective description, knowledge and interpretation of rural landscapes should be conserved with their all historical layers. Landscape Architecture profession is much important for understanding, interprating and transferring rural landscapes to the next generation.

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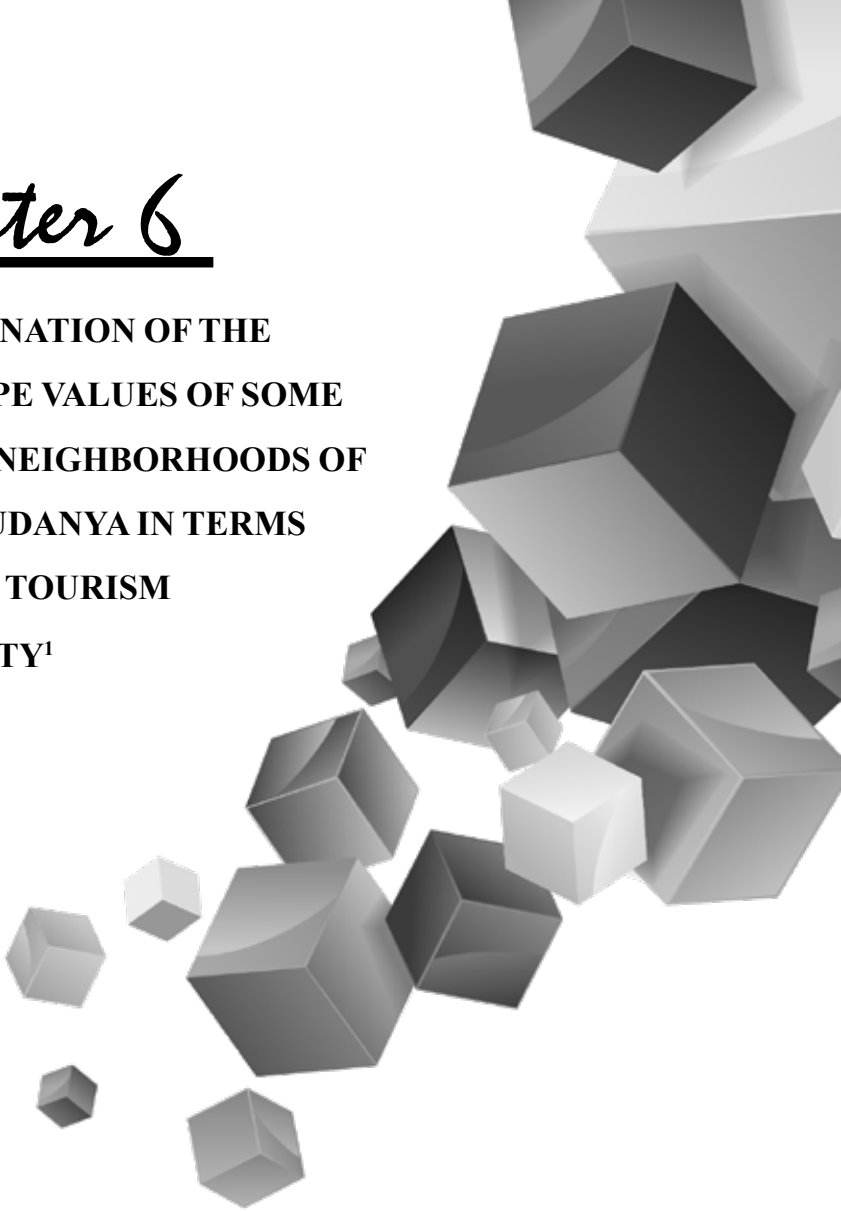
Chapter 6

AN EXAMINATION OF THE LANDSCAPE VALUES OF SOME COASTAL NEIGHBORHOODS OF BURSA-MUDANYA IN TERMS OF RURAL TOURISM POSSIBILITY[1]



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Introduction

The city-society profile that has emerged at the present time is composed of individuals who are stressed, who are very different from each other and who do not have joint sharings. The recreation areas in urban environments, which have been transformed into reinforced concrete masses, in which these individuals will do activities have been restricted, and the recreation areas have been differentiated depending on the economic conditions (Ertüzün and Fişekçioğlu, 2013). For this reason, people's need for nature-based activities arises from the fact that there is no exact harmony between the living conditions in urban areas and the environment they seek and they miss. In other words, cities cannot meet the need for changing one's environment and seeing different areas. Therefore, there is an orientation from urban areas to rural areas (Akten, 2003; Pirselimoğlu, 2007).

People meet these needs with recreational and touristic activities. As tourism has effects on the socio-economic structure in the region, natural and cultural landscape features are suitable environments for tourism activities. Natural and historical environmental values and economic, sociological and cultural factors constitute a framework for tourism activities (Kiper et al., 2011; Uslu, 1990). With their landscape features, local lifestyles and authenticity, rural landscapes are attractive points for tourism activities (Uslu and Kiper, 2006). In many tourism types which are done in rural areas (agricultural tourism, nature-based tourism, rural tourism, farm tourism, etc.), the natural landscape (geology, geomorphology, flora and fauna, hydrology, climate, etc.) and cultural landscape (population, culture, traditions, customs, economic activities, etc.) features have significant effects on tourism activities (Kiper et al., 2011; Topay and Memlük, 2011). According to McClelland et al. (1999), rural landscapes, which have been important areas of tourism and recreation activities in recent years, are geographical areas that include the natural features of the area, vegetation, water presence, structures, paths, other infrastructure elements, as well as the uses of area that emerge with the interaction of man with nature (Çetinkaya and Uzun, 2014). The types of tourism done in rural landscapes are highland tourism, nature-based tourism, village tourism, agricultural tourism, vegetation or botanical tourism and so on. Activities performed within these tourism types are (Pirselimoğlu Batman, 2013; Topay and Memlük, 2011; Roberts and Hall, 2001; Pirselimoğlu Batman & Zencirkıran, 2016; Zencirkıran et al. 2018) water-based activities, speedboat, swimming, sailboat, fishing (sea, river, stream etc.), hiking (hiking in nature, hiking, trekking), town-village trips, visiting historic areas, farm tourism, motor ride in the field (ATV), bike riding in the field (mountain bike), nature photography, nature resting, plant watching, nature studies, picnic, camping caravan, landscape viewing, etc.

These activities in rural areas are evaluated according to the natural and cultural landscape features of the areas.

In the rural areas, which have started to be preferred in line with the aim of spreading the tourism policies to a whole year and four seasons, large variations and changes have emerged in tourism activities. The intense uses on these areas and the danger of exceeding the carrying capacity and limit have revealed the fact that the planning for tourism purposes should prioritize the relationship balances among the elements that constitute the eco-system, cultural and historical environments. In this respect, appropriate planning studies should be taken into consideration (Pirselimoğlu Batman, 2013). In the field of integrated land use policies, tourist activities should aim not to exceed the carrying capacity level of the area. In these planning processes, the participation of the local people in the planning stage is also very important in ensuring the sustainability of tourism (Mbaiwa, 2003). In social terms, rural tourism aims to get free from being earthbound, in ecological terms, it aims to create the awareness of protecting the rural environment and in economic terms, it aims to create new activity areas for people living in rural areas. Tourism in rural areas should ensure that both urban and rural populations become aware of the physical, biological and spiritual values of nature as an inseparable part of the human (Pirselimoğlu, 2007). Generally, tourism in rural areas grows and develops as an integral part of the environment, it protects local identity in a sustainable way and strengthens the economy by contributing to it (Fons, Fierro and Patino, 2011; Ghaderi and Henderson, 2012). In the use of rural areas for tourism purposes, ecological approaches, which will ensure the sustainability of the areas, are important in order to prevent the negative impact and pressure of the field uses and also the damage of the socio-culture and environment. In this respect, ecological principles should be taken into consideration in planning studies that will ensure the protection of the eco-environment (Sutawa, 2012; Pirselimoğlu Batman, 2013; Akbulak and Cengiz, 2014; Shi et al., 2015). Ecological planning approaches are one of the most important components in the field-use planning system. In such approaches, land use planning and management objectives are to use existing land and related resources in a sustainable way, to continuously improve the quality of life of local people and to promote the objectives of local sustainable development (Zhao et al., 2015).

This study aims to evaluate the natural and cultural landscape values of the settlements with rural characteristics in terms of rural tourism opportunities. In this context, the study evaluated the relationship between rural tourism activities and landscape values in terms of the natural, cultural and historical features of the area.

Material and Method

The study was carried out in some coastal villages in the Mudanya district of Bursa province. Our study area is located to the west of the central settlements of Mudanya. Mudanya lies in the east-west direction to the north of the Mudanya Mountains which separates the Bursa Plain from the sea. It is bordered by Gemlik Bay in the north, Gemlik in the east, Osmangazi, and Nilüfer in the south and Karacabey in the West. The villages selected as the study area were transferred from village status to neighborhood status in 2014 under the whole city law. There are 47 neighborhoods in Mudanya district after the city law (URL-1). As a study area, 5 neighborhoods (Mesudiye, Eğerce, Söğütpınar, Esence, and Yalıçiftlik) were selected from these neighborhoods showing both coastal and rural characteristics (Figure 1).

Figure 1. *Study Area*

In this research, data collection, survey, evaluation, and analysis methods were used. As a result of the surveys conducted in some coastal neighborhoods (Mesudiye, Eğerce, Esence, Yalıçiftlik, Söğütpınar) of Mudanya district, current resource values were determined, natural and cultural landscape characteristics were established, the criteria for rural tourism possibilities were determined using various sources and scoring method was applied (Gülez 1990; Kiper et al., 2011; Pirselimoğlu Batman, 2013; Zencirkıran et al. 2017). The scoring of the criteria for each coastal region was given as insufficient (0 points), partially insufficient (1 point), partially sufficient (2 points) and sufficient (3 points) and was converted to percentage value via the total points that the villages got. In the determination of the differences between the coastal areas, SPSS 22 was used with the One-Way Variance analysis included in the package and the differences between the groups were determined with Duncan test at $p \leq 0.05$ error level (Özdamar, 2003).

Findings

In the findings part of the study, the existing natural and cultural landscape values of Mesudiye, Eğerce, Esence, Yaliciftlik and Sogutpinar neighborhoods were determined using the studies of Gülez (1990), Kiper et. al., (2011), and Pirselimoğlu Batman (2013) (Table 1) (Figure 2).

Table 1. *The natural and cultural landscape values of the study area*

NATURAL LANDSCAPE VALUES					
Geographical location; Area size	**Mesudiye**	**Eğerce**	**Söğütpınar**	**Esence**	**Yalıçiftlik**
	1808.569ha	572.1282ha	1066.979ha	2174.678ha	1416.719ha
Topographic structure; ***Slope;** 0-4%, 4-7%, 7-10%, 10-14%, 14-18%, 18-24%, 24-42%, 42% and over ***Exposition;** North, Northeast, East, Southeast, South, Southwest, West, Northwest	Mesudiye slope groups vary between 0-4%, 4-7%, and 7-10% weight. Mesudiye region consists mainly of northern views.	Eğerce slope groups vary between 0-4%, 4-7%, and 7-10% by weight. There are also slope groups larger than 18% from place to place. The northwestern view and the eastern view of the Esence neighborhood exist more densely.	Söğütpınar slope groups vary between 0-4%, 4-7%, and 7-10% weight. Söğütpınar neighborhood is dominated by the northwest, west and east views. Apart from these views, it is possible to see the views of the southeast.	Slope groups in the district of Esence vary between 0-4%, 4-7%, and 7-10% weight. In the Esence District, the northwest, west and east views dominate.	The slope groups of the area where the villages in the area are located vary between 0-4%, 4-7%, and 7-10% weight. The northwest, west and east views dominate. Apart from these views, it is possible to see the views of the southeast as well.
Plant (natural vegetation) and wildlife; *Woodland, thicket, *Meadow *Meadow and thicket *Only meadow *Only Thicket	There are wide sand dunes between Esence bay and Mesudiye. Mesudiye is an area dominated by woodlands, thickets, and meadows. In addition, there are oak, laurel, linden, pine areas, macquis groves, and pasture areas.	There are wide sand dunes between Esence bay and Mesudiye. Oak, laurel, pine, groups dominate in this area.	Pine tree dominates the Söğütpınar neighborhood. In a small section, oak and laurel are seen. In addition, the coastal pine areas are located as industrial plantation areas. This area is a region with gaps in the forests and agricultural areas.	In this area, there are oak, laurel, and pine. In addition to forest areas, there are distorted sparse forests, treeless forest areas, dunes, sparse areas out of forests, and agricultural areas.	There are stony and rocky parts in a very narrow area between Altintas and Yaliciftlik. A large part of the Yalıçiftlik neighborhood consists of sparse areas out of the forest and agricultural areas. In the forest area, there is pine. In this area, there are macquis groves and pasture areas. In addition, the coastal pine areas are located as industrial plantation areas.

Hydrology (Water existence); *The sea *Stream (creek, river, brook, etc.) *Lake	Being a seaside is a very important element for activities. It enables water-based activities and it is also the basic element for the activities in waterfront areas. Seawater temperature 12-23 ° C	Being a seaside is a very important element for activities. It enables water-based activities and it is also the basic element for the activities in waterfront areas. Seawater temperature 12-23 ° C	Being a seaside is a very important element for activities. It enables water-based activities and it is also the basic element for the activities in waterfront areas. Seawater temperature 12-23 ° C	Being a seaside is a very important element for activities. It enables water-based activities and it is also the basic element for the activities in waterfront areas. Seawater temperature 12-23 ° C	Being a seaside is a very important element for activities. It enables water-based activities and it is also the basic element for the activities in waterfront areas. Seawater temperature 12-23 ° C
Climatic characteristics; *Average Temperature *Average Precipitation *Average wind *Insolation	The area shows the characteristics of Bursa-Mudanya climate. Mudanya District has more Mediterranean Climate characteristics than Marmara (Transition) climate which is a transition between the Mediterranean and the Black Sea climates seen all across Marmara Region. The lack of warmth in the summer and warm weather in the winter due to the low elevation and the sea is evident (Caglarim, 1994; Ozsule, 2005; URL-1; URL-3). The prevailing wind comes from the north. The high sections of the area have enough wind for wind energy.				
Soil structure;	Within the boundaries of Mesudiye, there are soil groups of Limeless Brown Forest soil, Rendzinas, Brown forest soil, and alluvial soil.	Within the boundaries of Eğerce, there are soil groups of Limeless Brown Forest soil and Brown forest soil.	Within the boundaries of Söğütpınar, there are soil groups of Limeless Brown Forest soil and Brown forest soil.	Within the boundaries of Esence, there are soil groups of Rendzinas and Brown forest soil.	Within the boundaries of Yalıçiftlik, there are soil groups of Rendzinas, Brown forest soil and colluvial soil.
Geological Structure;	In Mudanya, Neogene-aged sedimentary masses such as sandstone, marl, and limestone cover a very wide area (Güzel et al. 1995). From the tectonic point of view, the Paleozoic and Eocene-aged units of the Mudanya Mountains in the north skirts, which extend parallel to the shore between Bandırma and Gemlik, have a curved structure which was primarily influenced by the Caledonian and Hercynian orogenesis. The most important tectonic structure in the region is a branch of the North Anatolian Fault zone that enters into the sea from Gemlik Bay and passes through off the coast of Mudanya parallel to the coastline (Özsüle, 2005).				

Other features; *Visual landscape value (Panoramic views, beautiful views, and vistas, etc.) *Presence of the monument tree *Presence of endemic plant species	There are important points of scenery to enjoy. Endemic plant species *Lavandula stoechas L.Subbsp.* cariensis (Boiss.) Rozeira Lavender flower is located between Eğerce and Mesudiye. *Verbascum bombyciferum* Boiss.- mullein, Rare taxa (*Pancratium maritimum* L.) - sea daffodil	There are important points of scenery to enjoy. Endemic plant species *Lavandula stoechas L.Subbsp.* cariensis (Boiss.) Rozeira Lavender flower is located between Eğerce and Mesudiye. *Verbascum bombyciferum* Boiss.- mullein, Rare taxa (*Pancratium maritimum* L.) - sea daffodil	There are important points of scenery to enjoy.	There are important points of scenery to enjoy.	There are important points of scenery to enjoy.
CULTURAL LANDSCAPE VALUES					
	Mesudiye	**Eğerce**	**Söğütpınar**	**Esence**	**Yalıçiftlik**
Population (TUIK, 2018);	334 people	228 people	286 people	982 people	442 people
Transportation; *Closeness to the city center *The touristic importance of the region; Marmara coastline, Important road routes, priority regions for tourism *Time reached; By Vehicle- 1-2 hours *Type of transportation; private vehicle, public transport. * Car park Status of roads in the area	The transportation opportunities from the center of Mudanya to Mesudiye neighborhood are not enough. It is possible to get there by buses that depart from Bursa at certain times. It is possible to get there by private vehicle but public transport is not enough. Parking areas in the coastal areas are available but the parking capacity is not enough on busy days. Maintenance of the roads of the area is not sufficient.	The transportation opportunities from the center of Mudanya to Eğerce neighborhood are not enough. It is possible to get there by buses that depart from Bursa at certain times. It is possible to get there by private vehicle but public transport is not enough. Parking areas in the coastal areas are available but the parking capacity is not enough on busy days. Maintenance of the roads of the area is not sufficient.	The transportation opportunities from the center of Mudanya to this neighborhood are not enough. It is possible to get there by private vehicle but public transport is not enough. Parking areas are not available. Maintenance of the roads of the area is not sufficient.	The transportation opportunities from the center of Mudanya are not enough. It is possible to get there by buses that depart from Bursa at certain times. It is possible to get there by private vehicle but public transport is not enough. Parking areas in the coastal areas are available but the parking capacity is not enough on busy days. Maintenance of the roads of the area is not sufficient.	The transportation opportunities from the center of Mudanya are not enough. It is possible to get there by private vehicle but public transport is not enough. Parking areas are not available. Maintenance of the roads of the area is not sufficient.

Available area usage; *Settlements *Garden (dry) *Heaths *Dry farming (with fallow) *Dry farming (without fallow) *Forest *Olive grove	Settlements are irregular and neglected. Agriculture is done to meet the needs of local people. Settlement, dry agriculture (without fallow), forest, heaths dominate the use of the area.	Settlements are irregular and neglected. Settlements and dry class agriculture (without fallow) dominate the area.	Settlements are irregular and neglected. Settlements, heaths, and dry agriculture (without fallow) dominate the area.	Settlements are irregular and neglected. Settlements, dry agriculture (without fallow), and olive dominate the area.	Settlements are irregular and neglected. Settlements, heaths and dry agriculture (without fallow), dominate the area.
Historical values; *Mosques *Inns, Turkish baths *Churches *Fountains *Settlements, houses, etc.	There are important historical values in the surrounding settlements of our study area: *Tirilye*; Stone School, Fatih Mosque (Hagios Stephanos-Hinolakkos Church), Monastery church, Arched church, Ottoman Bath Fountains, -*Kumyaka*; The Church of the Archangels, Kumyaka Baths, fountains, Monumental Trees-*Mudanya center*; Armistice Building, Crete District, Old Mosque, Hasanbey Mosque, Tahir Pasha Mansion, Montania Hotel. **Kapanca Port** - It is located between the port of Kapanca-Tirilye and Yalıçiftlik District. There are a church and windmill ruins near the port. Kapanca Port had been an important point of transportation that transported the products of the fertile soil from Istanbul (Constantinople) to Kite (Ürünlü) and Prusa (Bursa) from the first years of history until the first years of the Republic (the 1920s). There is a church in Yalikiftlik with its foundation. In addition, the presence of Esence (Eskel) and Mesudiye-Ayazma churches are known. However, they have not survived (Genc, 2015).				
Cultural values; *Festivals *Handicrafts *Traditional food	There are festivals around the study area. However, it is not possible to mention these values for the area. Vintage Festival, Black Fig Festival, and Olive Festivals are organized in Mudanya.				

Other features; *The area is well-maintained *Infrastructure facilities for tourist activities (accommodation, eating-drinking areas, garbage, WC, lighting, etc.) *The existence of building and reinforcement elements according to recreational and touristic uses in the area *Orientation to the area; signs *Current manual activities *Beaches, sea water quality *Fishing	The area is neglected.There is not enough infrastructure. The reinforcement elements are insufficient. There are not enough recreational and touristic activities planned regularly. There is a wind power plant under construction within the boundaries of the area (wind turbines) There is a public beach of the metropolitan municipality. Mesudiye Public Beach was measured and concluded to be perfect according to the Swimming Water Monitoring System of the Ministry of Health of Turkey, General Directorate of Public Health (URL 2). Fishing activities are conducted in the area.	The area is neglected. There is not enough infrastructure. The reinforcement elements are insufficient. There are not enough recreational and touristic activities planned regularly. There is a public beach of the metropolitan municipality. Eğerce Public Beach was measured and concluded to be perfect according to the Swimming Water Monitoring System of the Ministry of Health of Turkey, General Directorate of Public Health (URL 2). Fishing activities are conducted in the area.	The area is neglected. There is not enough infrastructure. The reinforcement elements are insufficient. There are not enough recreational and touristic activities planned regularly. There is a wind power plant under construction within the boundaries of the area (wind turbines).	The area is neglected. There is not enough infrastructure. The reinforcement elements are insufficient. There are not enough recreational and touristic activities planned regularly. There is a public beach of the metropolitan municipality. There is Eşkel Beach here. The sea water cleanness was rated as good (URL 2). Fishing activities are conducted in the area.	The area is neglected. There is not enough infrastructure. The reinforcement elements are insufficient. There are not enough recreational and touristic activities planned regularly. There is a wind power plant under construction within the boundaries of the area (wind turbines).

Figure 2. *General properties of the study area*

The scores of each coastal village were added and converted into a percentage value (Gülez 1990; Kiper et al., 2011) (Table 2). The evaluation of the scorings which were calculated according to Table 2 reveals that climatic characteristics, soil structure and geological structure characteristics in terms of natural landscape values were found to be partially sufficient in Mesudiye, Eğerce, Sögütpınar and Yalıçiftlik neighborhoods and they got the point 1, while in Esence neighborhood, they were found to be sufficient and the neighborhood got the point 2. In terms of geographical location and vegetation, all neighborhoods were evaluated as adequate and given 2 points.

On the other hand, in terms of historical values, only the Yalıçiftlik neighborhood was partially sufficient and got the point 1 and the other neighborhoods were observed to be inadequate and got the point 0. All the neighborhoods were found to be partially sufficient in terms of transportation and got 1 point. Statistical evaluations of coastal neighborhoods based on natural and cultural landscape values exhibited significant differences at $p \leq 0.05$ level. While the Mesudiye neighborhood has a higher value of 22.09% than the other neighborhoods in terms of its natural and cultural landscape values, Sögütpınar and Esence neighborhoods were determined to have a lower value of 18.60% (Table 3).

Table 2. *Scoring of natural and cultural landscape values of coastal villages*

Natural Landscape Values	**Mesudiye**	**Eğerce**	**Söğütpınar**	**Esence**	**Yalıçiftlik**
Geographic location	2	2	2	2	2
Topographic structure	1	1	2	1	1
Presence of plant (natural flora) and wildlife	2	1	1	1	0
Hydrology (Water presence)	2	2	2	2	1
Climatic features	1	1	1	1	2
Soil structure	1	1	1	2	2
Geological Structure	1	1	1	1	2
Other Features	2	2	1	1	2
Cultural Landscape Values	**Mesudiye**	**Eğerce**	**Söğütpınar**	**Esence**	**Yalıçiftlik**
Population	2	2	2	2	2
Transportation	1	1	1	1	1
Existing land use	2	1	1	1	1
Historical Values	0	0	0	0	1
Cultural Values	1	1	1	1	1
Other Features	1	1	0	0	0

Table 3. *Analysis of natural and cultural landscape values of coastal villages.*

Neigborhood	**Natural Landscape Values**	**Cultural Landscape Values**	**Total Score**	**Frequencies (%)**
Mesudiye	12	7	19	22.35 a
Eğerce	11	6	17	20.00 b
Söğütpınar	11	5	16	18.82 b
Esence	11	5	16	18.82 b
Yalıçiftlik	11	6	17	20.00 b

* Letters show different groups in $p \leq 0.05$ level.

Discussion and Conclusion

The socio-economic changes that started with industrialization formed artificial environments with the extension of urbanization over the rural areas. The deteriorated natural environments have been the areas of longing for people living in cities. People are looking for different ways to experience these environments. In these searches, rural environments took an important place. With their climatic conditions, natural features, landscape beauties, and rural lifestyles, rural areas have been interesting points for tourism. The distinctive cultural geographical appearance and lifestyle that emerged by the traditional agricultural activities reveal a good relationship between agriculture and tourism. The rural areas shaped by human activities do not include large urbanized structures, but they contain some nucleated settlements (farms, villages, small towns, etc.). In summary, rural areas are important areas for tourism with their natural features, climatic values,

landscape beauties, and rural lifestyles. Rural tourism includes activities related to rural functions, natural resources, and traditional features. With these activities, it contributes to rural development and also supports the sustainability of tourism. At this point, it is important to know all the positive and negative characteristics of rural tourism, to believe that it can be as a successful development tool as agriculture and to do the necessary (Demirel, 1997; Soykan, 2002; Kuntay, 2004; Özgünç, 2003; Pirselimoğlu, 2007). When describing tourism activities in rural areas, a very different type of tourism can be encountered. These are expressed as Green Tourism, Farm Tourism, Agricultural Tourism, Village Tourism, Highland Tourism, Ecotourism, etc. From this point of view, it is possible to indicate that there is no single activity. However, there are many typologies in this direction (Pirselimoğlu Batman, 2013; Pirselimoğlu, 2007). According to Kuntay (2004), it would be a different experience for tourists to go up to the highland and taste a local meal at local people's houses. These areas and local lifestyles will offer different cultures for people living in cities. In their studies regarding recreation in rural areas and tourism planning, Mason and Leberman (2000) mentioned the mountain biking activity which the participants showed great interest in recent years, as well as the activities that can be done in the rural areas. They expressed them as activities that challenge skills, enable doing exercise, exploring new fields, enables physical struggle, and providing socialization with friends by participating in collective activities with tools such as bicycle and motorcycle. Özer and Çavuşoğlu (2014) emphasized that local events are an important tourism tool. Raising the importance of rural tourism types (hunting tourism, trekking, river tourism, underwater diving, mountaineering, sportive angling, bird watching, cave tourism, plateau tourism) along with local activities will provide the development of many types of rural tourism. The rural districts of Mudanya district of Bursa province which are Mesudiye, Eğerce, Söğütpınar Esence, and Yalıçiftlik coastal neighborhoods were determined as areas that can be developed for rural tourism with their natural and cultural landscaping values, as well as agricultural activities and agricultural lifestyle. With its natural and cultural landscape values, the Mesudiye neighborhood got the highest score. In addition, it is possible to indicate that by location, the Mesudiye neighborhood is the farthest neighborhood from the district center and the farthest area from urban effects. Among the five neighborhoods within the study area, coast usages in Mesudiye, Esence, and Eğerce are intense. Especially during the summer, it is observed that the use of beaches is more intense and secondary residences are more common. The settlement is generally concentrated as secondary residences in the coastal areas, whereas in the inner parts and hilly high areas, there are centers of neighborhoods and old settlements. Considering the natural and cultural landscape values required for rural tourism in the study area, it was determined that the area may be suitable for rural tourism

in terms of geographical location and size. Views are one of the most important elements in the natural landscape structure and they are important for the practicability of the activities, and the best expositions are the southern expositions, eastern expositions that see the morning sun, and the western expositions that see the late afternoon sun (Sirel, 1995). In the study area, northwestern, western and eastern exposition were observed to be dominant in the districts of Eğerce, Sogutpinar, Esence, and Yaliciftlik. However, the presence of forests and their state of closedness constitute a preferable condition for rural tourism activities. The vegetation of Mudanya (Davis, 1965-1985) located in the A2 (A) square within the Mediterranean phytogeographical region is similar to the Mediterranean vegetation. The Mediterranean plant community is mostly seen on the south-facing slopes, and as the height increases on the north-facing slopes, the xerophyte character of the natural vegetation is reduced and it turns into a humid forest character (Ötüken 1986; Elitoğ 1989; Güzel et al. 1995). In the study area, Mesudiye neighborhood has the highest forest existence. In addition, in the sandy areas in the border region of Mesudiye and Eğerce neighborhoods along the coastline, there is *Lavandula stoechas* L.subsp.. *cariensis* (Boiss.) Rozeira – lavender endemic species. Moreover, it is seen that rare natural species such as Verbascum bombyciferum Boiss.- mullein and Pancratium maritimum L.- sea daffodil are found in the area and can be an alternative value for botanical tourism. There are limeless brown forest soils in areas with broad-leafed forest cover. However, with the raw materials of limestone, dolomite, marl, and chalk, rendzina soils can be encountered in grass, meadows and heathland areas. The forests and heaths are located in are sheer, steep and very steep slopes and the soil has shallow and very shallow characteristics. While the lands on which dry farming is done have flat mild, medium steep and very steep slopes, deep, medium deep and shallow profiled soils, gardens have the soil profile of mild, medium and steep slopes. In addition, coastal areas are composed of coastal dunes, bare rock, and debris (Güzel et al., 1995). The climatic characteristics of the area are suitable for four-season tourism activities. In addition, the dominant hills in the area, coastal areas, large agricultural areas, forested areas, and the presence of the sea, etc. were observed as the dominating points of scenery. The eastern regions of our study, namely Yalıçiftlik area is the point where there are more suitable areas for agriculture. It is suitable for agricultural activities (agricultural experiences, farm activities, crop harvesting, etc.) to be developed within the scope of rural tourism. Olive is in the foreground in terms of agricultural activities. Yalıçiftlik and Esence is a region where olive groves are more intense. It is important to consider the expectations and wishes of the tourists while analyzing the development potential of ecotourism within the scope of tourism types to be made in rural areas. In addition to this, evaluations of tourist interests according to the tourism characteristics of the area such as a village or rural accommodation, village

tours and handicrafts market indicates that the tourism potential is determinable (Chaminuka et al., 2012). The most important problems of the study area (Mesudiye, Eğerce, Sogutpinar, Esence, and Yaliciftlik) in general are the lack of maintenance and lack of adequate transportation facilities. In addition, the lack of adequate infrastructure and reinforcement opportunities in the use of coastal areas constitute the other negative features for the area. The study area and its surroundings still maintain the quality of not having been industrialized and urbanized and also contain predominantly rural lifestyle based on agriculture. The inadequacy of the transportation network in the region and also the inability to install the infrastructure properly are undesirable in terms of the development of tourism. With the preference of tourism and the development of rural areas, changes in rural areas and the transformation of the traditional rural economy will be inevitable (Wu, 2018). According to Gür (1992), the development of the tourism sector in the country's economy will activate the natural, cultural and social resources of the regions and the utilization of them in accordance with the region's characteristics will contribute to the development of the region and the country sooner. Pirselimoğlu Batman et al. (2016) emphasized that physical and ecological planning efforts to direct natural resources and environmental activities have been increasing in order to create a more livable environment in Turkey in recent years. The importance of ecological principles for the protection of eco-environment is increasing. Plans in this context will contribute to both economic development and environmental protection (Shi et al., 2015). According to the field studies, although the natural and cultural resource values of the area were determined to be adequate for rural tourism, no regular tourism activity is carried out in the area. Daily activities, on the other hand, do not take place within an order. Rural tourism activities in the area are not sufficient. There is no planning work for rural tourism specific to the study area which preserves resource values and utilizes them while preserving. In their study, Bekdemir et al. (2010) emphasized the problems arising from these situations as there is no adequate control mechanism in the activities of the new ecotourism, there is environmental pollution caused by day-to-day use of the protected areas and there is unconscious use of the protected areas and settlements in them. In areas with ecological sensitivity based on natural cultural landscape elements, it is necessary to adopt an understanding of tourism that respects the natural cultural resource values and responds to the tendencies and demands of tourists (Pirselimoğlu Batman, 2013; Pirselimoğlu Batman and Demirel, 2015; Pirselimoğlu Batman et.el. 2016). The ecological sensitivity structure of the area or region should be considered in planning activities to be performed in areas with high ecological sensitivity (Düzgüneş and Demirel, 2016).

Suggestion

Mesudiye, Eğerce, Söğütpınar, Esence and Yalıçiftlik neighborhoods, which were evaluated within the scope of the study, provide rural tourism activities in terms of natural and cultural resource values as well as preserve chasteness by not being known too much and not being sufficiently accessible. Starting from this point, it is important to carry out planning works by taking into consideration the protection-use balance in the activities to be carried out for tourism purposes within the working area. In addition to this, it is necessary to raise the awareness of local people in order to prepare for future structural changes in parallel with the development of tourism. Village/town/farm tourism can be developed by encouraging hostel accommodation in the neighborhoods within the scope of rural tourism diversification. The fields where village life can be introduced can be organized and activities such as harvesting and processing of agricultural products that reflect village culture can be done. In nature-based tourism, coastal and marine uses should be diversified. In the current coastal use, the use of beaches should be improved and reinforcements and infrastructure facilities should be enriched.On the other hand, it is possible to create an alternative route to promote the existence of rare taxa and endemic species in the area and allow for botanical trips. Thus, the awareness of the importance of protection measures will be ensured by being aware of these values and sustainability will be provided. Since the coastal neighborhoods of the study area are rich in natural resources and have forest, sea, river, etc. and have the appropriate gradient, they have the qualities that enable creating trekking or cycling routes. Moreover, it is possible to create sightseeing routes for nature photography thanks to panoramic scenery spots (mountain, sea, agricultural areas, rocky areas, etc.). Camping, which is another nature-based tourism activity, can be done in forest areas or in coastal areas and it can be developed. For all these activities, infrastructure facilities should be implemented within the boundaries of the area by respecting the resource values and the reinforcements to be used for these activities should be appropriate to the characteristics of rural areas. The fact that the settlements, especially the ones in the coastal areas are very neglected and irregular is one of the most important problems in the neighborhoods in the study area. The arrangement of the infrastructure works of the neighborhoods should ensure unity of the house facades and streets. Designing these areas as a whole will help to increase their appeal by ensuring that their designs comply with their nature and rural culture. On the other hand, while the inadequacy of the transport network is a surplus value of the area for its chasteness, it prevents its recognition. Road network needs to be maintained and public transport should be increased. By developing alternative public transport facilities (transportation by sea

from Mudanya), diversity in both transportation and tourism activities will be ensured. It is also important to increase directional, promotional and informative signboards and direction signs in transport. In line with these suggestions, local people and user requests for the study area should be evaluated together with the opinions of experts and local administrations and should enable the implementation of rural tourism activities based on holistic planning approaches.

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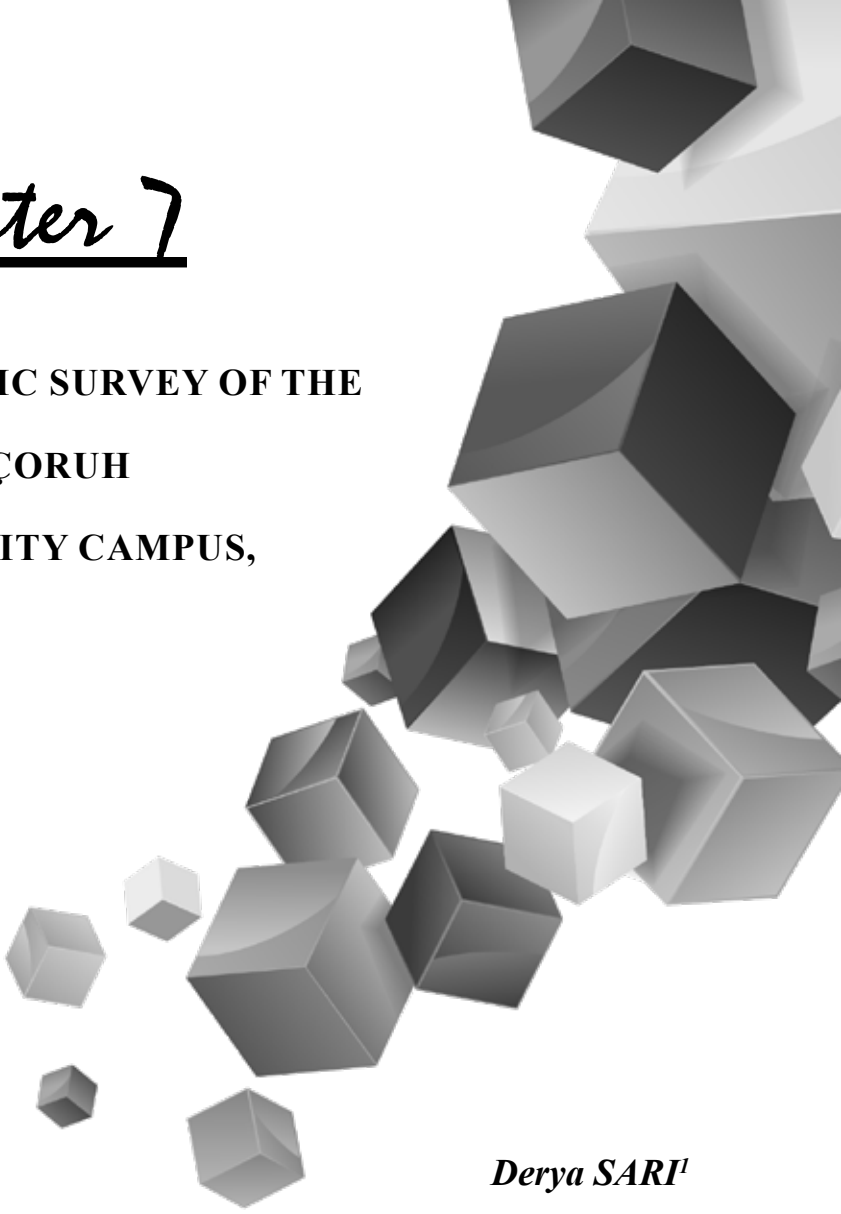
Chapter 7

FLORISTIC SURVEY OF THE ARTVIN ÇORUH UNIVERSITY CAMPUS, TURKEY*



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INTRODUCTION

Cities and their hinterland include more complex ecosystems when compared to natural or semi-natural areas. This is due to human-induced factors such as rapid urban development and the fragmentation of habitats that lead to the decline in the ecosystem, as a consequence of local and general land use decisions rather than natural processes.

Several factors could directly or indirectly affect the floristic diversity in a city. The main factors include factors associated with urban morphology, sociological factors, anthropogenic factors and environmental factors. The size and geographical features of an urban area and urban occupancy are among the factors that determine the urban flora. For example, in a city, various types of land use such as residential and mixed occupancy zones, green areas and parks, industrial and commercial zones, agricultural zones, rivers, lakes, traffic areas, public areas and forest areas could be observed. Naturally, these types of land use lead to novel ecosystems (Schmidt et al. 2014) and diverse urban flora. Human activities and future population growth would drastically affect urban ecosystems and their biodiversity (Schmidt et al. 2014; Lososová et al. 2018).

Urban green spaces are critical for biodiversity (Aronson et al. 2017) and important due to multiple ecosystem facilities they provide (Nehru et al. 2012). In floristic terms, it was observed that urban areas are richer when compared to the suburbs due to higher habitat heterogeneity and the presence of exotic species (Pyšek 1998). Urbanization facilitates the expansion of the introduced species (McKinney 2008; Pyšek et al. 2010). The increase in non-indigenous species towards the urban center is a result of several human influences. One of these is the increase in human population towards the urban center that leads to an increase in the plantation of non-indigenous species such as foreign plant cultivars (Kowarik, 1995).

Several open green areas are classified within the urban mosaic, each providing valuable facilities for the urban green infrastructure. University campuses, which are urban open green spaces, serve various occupant groups that include academic, administrative and technical staff, students and sometimes locals and have several functions (Karaşah et al.2016). Certain important university campus functions include allowing the integrity between the buildings and the campus, providing a necessary space for the circulation system, allowing the outdoor organization to meet the recreational campus requirements, establishing a relationship between the occupants and the environment in the campus, creating reserves to meet physical campus development requirements, and contributing to the aesthetic value of the campus. (Yılmaz, 1998; Ertekin and Çorbacı, 2010). Furthermore, university campuses are important spaces that support urban biodiversity due to their floristic diversity.

The conditions are relatively homogenous in university campuses when compared to cities, which makes them suitable for comparisons across large environmental scales and they often provide reliable plant surveys since several botanists work in campuses (Moerman and Estabrook 2006; Liu et al. 2017). Plant diversity surveys are important since they provide baseline information for comparison after modification of the habitats and to monitor temporal changes in biodiversity. Survey results allow the determination of the availability of rare, endangered, exotic, native, weed, and medicinal plant species (Uddin and Hassan, 2016). Several floristic studies were conducted in university campuses in Turkey (i.e., Türe and Böcük, 2001; Parmaksız et al. 2006; Deveci et al. 2012; Töre and Erik, 2012; Salık and Güler, 2018). In a current study, Güler (2019) identified the drivers plant species variations across 31 university campuses in Turkey.

Keeping track of the plant material available in continuously developing university campuses is a requirement for accurate design and planning decisions. Founded in 2007, Artvin Coruh University (ACU) is a relatively young campus and located in Artvin province, which is one of the provinces with rich natural plant diversity in Turkey; thus, it has a significant potential. The present study aimed to conduct a floristic survey in ACU campuses to determine the sustainability of green campus areas, the employment of plant species to raise awareness and availability as research material for students, academicians, the public and stakeholders, to register the plant species, to contribute to the development of a plant database, and to determine floristic diversity in the campuses.

MATERYAL VE METOT

Founded in 2007, ACU is located in Artvin Province in Eastern Black Sea region in Turkey (Figure 1). The coastal sections of the region are wet, and continental and Mediterranean climates are prominent in inner parts. The average annual temperature is 12.3°C, and the average annual precipitation is 693.3 mm in Artvin (Turkish General Directorate of Meteorology, 2020). However, the annual average temperature is 13.5°C and the average annual precipitation is 1009.3 mm in Borcka district in Artvin. The annual average temperature is 14.4°C, and the average annual precipitation is 2087 mm in Hopa district. Thus, Artvin is located in a region where temperature and precipitation variations could be observed across nearby areas due to elevation differences that could reach about 4000 m above the sea level.

Figure 1. The locations of Artvin province and the four campuses

One of the major rivers in Turkey, namely the Coruh River passes through Artvin province. Thanks to the microclimatic effect, the Mediterranean climate is observed on Coruh River valley. Thus, in addition to the Black Sea climate plants, Mediterranean plants are also prevalent in the province. Artvin is in A8 section based on the Turkish flora grid system, which is the colchic section in the Euro - Siberian phytogeographic region of the Holarctic Flora zone (Davis 1965-1985). Thus, Artvin province has extensive floristic diversity.

ACU has 5 campuses located in Artvin city center and districts. ACU campus was divided due to the slopped and mountainous geographical structure in Artvin city center. Thus, certain campuses that include some faculties are located in the districts (i.e., Hopa, Borcka, Arhavi campuses). In the present study, the Central and Seyitler campuses located in two locations in the city center, Borcka Campus located in Borcka district, and Hopa Campus located in Hopa district were investigated (Figure 2).

The central campus is located on the banks of the Coruh River (345 m altitude) and the plant species identified in 5.5 hectares of the campus were analyzed in the study. Seyitler campus is located 9 km away from the city center (579 m altitude) and 8.6 hectares of the campus were analyzed in the study. Borcka campus is 24 km away from the city center (253 m altitude) and covers an area of approximately 2.5 hectares. Hopa campus is 65 km away from the city center (10 m altitude) and covers an area of approximately 1.5 hectares (Figure 2).

Figure 2. Campus areas (a: Central campus, b: Seyitler campus, c: Borçka campus, d: Hopa campus)

The campuses and planting activities are about 10 years old. Thus, the woody plant species in the campuses were identified and listed to monitor these relatively young campuses and to take the floristic inventory. The species, the count and other properties of the plant species are entered in Excel tables. The count compositions of the plant species in the campus areas were determined with cluster analysis. The dendrograms were developed with PAST 4.03 statistics software (Hammer et al. 2001).

FINDINGS

In the study, 205 woody taxa in 56 families were determined in four campuses (Table 1). The families of the determined taxa are presented in Figure 3. Thus, the first three families with the highest number of species were *Cupressaceae* (27 taxa), *Rosaceae* (26 taxa) and *Sapindaceae* (17 taxa). Based on the life forms, the majority of taxa were Angiosperm bushes (60 taxa) and trees (58 taxa), followed by Angiosperm shrubs (33 taxa) and Gymnosperm trees (24 taxa) (Figure 4).

Among the identified plant species, 106 taxa were evergreens and 99 taxa were deciduous. Furthermore, it was determined that 63% of the plant species planted in the campuses were exotic and 37% were indigenous taxa (Figure 5).

The highest number of taxa was determined in Seyitler Campus (127 taxa), followed by the Central Campus (105 taxa), Hopa Campus (73 taxa) and Borcka Campus (35 taxa), respectively (Figure 6).

It was determined that *Photinia x fraseri, Berberis thunbergii* 'Atropurpurea'*,* x *Cupressocyparis leylandii, Platycladus orientalis, Cupressus macrocarpa* 'Gold Crest '*, Cercis siliquastrum, Acer platonoides* 'Crimson King' and *Cedrus deodara* species were identified in all four campuses. Furthermore, the species identified in 3 campuses included *Rosa meilland*, *Buxus sempervirens*, *Viburnum tinus*, *Rosa* sp., *Cotoneaster horizontalis*, *Pittosporum tobira* 'Nana', *Spiraea* x *vanhouttei*, *Cupressus sempervirens*, 'Pyramidalis', *Punica granatum*, *Yucca filamentosa*, *Platanus orientalis*, *Arbutus unedo*, *Pinus sylvestris*, *Taxus baccata* 'Fastigiata', *Picea pungens* 'Glauca', *Corylus avellana* 'Contorta', *Cedrus atlantica* 'Glauca', *Liriodendron tulipifera*, *Ginkgo biloba* 'Mariken'.

Based on the classification based on the plant species count in campus areas, the first cluster the included the most prevalent tree and shrub species included *Cupressocyparis × leylandii, Platycladus orientalis, Cupressus macrocarpa* 'Gold Crest', *Aesculus hippocastanum, Acer cappadocicum* 'Aureum', and *Malus floribunda* (Figure 7), while the most prevalent shrubs and crawlers inlcuded *Rosa meilland, Photinia x fraseri* 'Red Robin', *Wisteria sinensis, Hedera helix, Buxus sempervirens, Parthenocissus quinquefolia, Berberis thunbergii* 'Atropurpurea', *Ligustrum japonicum, Viburnum tinus, Hydrangea macrophylla,* and *Rosa* sp. (Figure 8).

It was determined that most plant species in the campus areas were exotic taxa and cultivars in general. However, certain domestic species were also planted in campus areas (e.g., *Olea europaea, Sorbus aucaparia, Punica granatum, Cotinus coggygria, Acer cappadocicum, Pinus pinea* and *Abies nordmanniana, Platanus orientalis, Tilia platyphyllos*). For example, it was determined that *Pinus pinea* and *Olea europaea* species, which are indigenous to the banks of the Coruh River and under the threat of extinction due to the construction of dams, were used to provide shadow in sitting spaces in the Central Campus for preservation and to raise awareness.

The plant species employed in the campuses were significant based on their aesthetic features such as flowering, autumn colors, form and fruits. It was observed that the plant features such as form and autumn colors were

used to create focal points and emphasis in campus areas (e.g., *Cupressus sempervirens* 'Pyramidalis', *Picea glauca* 'Conica', *Acer cappadocicum* 'Aureum' and *Liquidambar styraciflua*). Furthermore, it was determined that creeper species such as *Jasminum officinale, Lonicera japonica* and *Wisteria sinensis* with fragrance were used in sitting areas and as cover elements.

It was determined that the plant species employed in the campuses were generally suitable for the ecological habitat properties of the area. However, due to the microclimate effect of the Coruh River valley in the Central Campus, certain species such as *Taxus baccata*, which are not resistant to rising temperatures in summer, needed to be protected and maintained. It was determined that the tree species with a large diameter provided bio-comfort for the occupants (e.g., *Platanus orientalis*).

Table 1. *The alphabetical taxon list of the plants in ACU campuses*

Plant No	Taxon Name	Families	Total Number
1	*Abies nordmanniana* (Steven) Spach	*Pinaceae*	2
2	*Acacia dealbata*Link	*Leguminosae*	4
3	*Acer campestre*L.	*Sapindaceae*	20
4	*Acer cappadocicum* Gled. 'Aureum'	*Sapindaceae*	43
5	*Acer negundo* L.	*Sapindaceae*	5
6	*Acer negundo* L. 'Aureovariegatum'	*Sapindaceae*	6
7	*Acer palmatum*Thunb.	*Sapindaceae*	6
8	*Acer palmatum* 'Atropurpureum'	*Sapindaceae*	3
9	*Acer palmatum* 'Dissectum Atropurpureum'	*Sapindaceae*	1
10	*Acer platanoides*L.	*Sapindaceae*	13
11	*Acer platanoides* 'Globosum'	*Sapindaceae*	10
12	*Acer platonoides* 'Crimson King'	*Sapindaceae*	17
13	*Acer pseudoplatanus*L.	*Sapindaceae*	15
14	*Acer pseudoplatanus* 'Atropurpureum'	*Sapindaceae*	4
15	*Acer saccharinum*L.	*Sapindaceae*	1
16	*Acer saccharinum* 'Pyramidale'	*Sapindaceae*	5
17	*Acer saccharum*Marshall	*Sapindaceae*	20
18	*Aesculus hippocastanum*L.	*Sapindaceae*	53
19	*Agave americana* L.	*Asparagaceae*	9
20	*Ailanthus altissima* (Mill.) Swingle	*Simaroubaceae*	8
21	*Albizia julibrissin* Durazz.	*Leguminosae*	1
22	*Arbutus unedoL.*	*Ericaceae*	17
23	*Aucuba japonica* Thunb.	*Garryaceae*	3
24	*Azalea japonica* A.Gray	*Ericaceae*	2
25	*Berberis thunbergii* DC. 'Atropurpurea'	*Berberidaceae*	112
26	*Betula pendula* Roth	*Betulaceae*	12
27	*Betula pendula* 'Youngii'	*Betulaceae*	1

28	*Betula* sp.	*Betulaceae*	1
29	*Buxus microphylla* Siebold & Zucc.	*Buxaceae*	8
30	*Buxus sempervirens*L.	*Buxaceae*	124
31	*Callistemon citrinus* (Curtis) Skeels	*Myrtaceae*	22
32	*Calocedrus decurrens* (Torr.) Florin 'Aureovariegata'	*Cupressaceae*	4
33	*Camellia japonica* L.	*Theaceae*	8
34	*Campsis radicans* (L.) Seem.	*Bignoniaceae*	55
35	*Carpinus betulus* L. 'Pyramidalis'	*Betulaceae*	9
36	*Catalpa bignonioides* Walter 'Nana'	*Bignoniaceae*	3
37	*Cedrus atlantica* (Endl.) Manetti ex Carrière 'Glauca'	*Pinaceae*	7
38	*Cedrus atlantica* (Endl.) Manetti ex Carrière 'Glauca Pendula'	*Pinaceae*	2
39	*Cedrus deodara* (Roxb. ex D.Don) G.Don	*Pinaceae*	15
40	*Cerasus avium* (L.) Moench (*Prunus avium* (L.) L.)	*Rosaceae*	3
41	*Cercis siliquastrum*L.	*Leguminosae*	26
42	*Chaenomeles japonica* (Thunb.) Lindl. ex Spach	*Rosaceae*	13
43	*Chamaecyparis lawsoniana* (A.Murray bis) Parl. 'Golden Wonder'	*Cupressaceae*	3
44	*Chamaecyparis lawsoniana* (A.Murray bis) Parl. 'Pembury Blue'	*Cupressaceae*	2
45	*Chamaecyparis lawsoniana* (A.Murray bis) Parl. 'Ellwoodii'	*Cupressaceae*	2
46	*Chamaecyparis nootkaensis* (D.Don) Spach 'Pendula' (Cupressus nootkatensis D.Don)	*Cupressaceae*	6
47	*Chamaecyparis pisifera* (Siebold & Zucc.) Endl.	*Cupressaceae*	7
48	*Chamaerops excelsa* Thunb. (*Rhapis excelsa* (Thunb.) Henry)	*Arecaceae*	6
49	*Cinnamomum camphora* (L.) J.Presl	*Lauraceae*	2
50	*Citrus* sp.	*Rutaceae*	3
51	*Clematis* sp.	*Ranunculaceae*	30
52	*Cornus alba* L.	*Cornaceae*	7
53	*Corylus avellana* L. 'Contorta'	*Betulaceae*	9
54	*Cotinus coggygria* Scop. 'Royal purple'	*Anacardiaceae*	7
55	*Cotinus coggygria* Scop.	*Anacardiaceae*	15
56	*Cotoneaster horizontalis* Decne.	*Rosaceae*	84
57	*Cotoneaster horizontalis* Decne. 'Microphylla'	*Rosaceae*	5
58	*Cotoneaster lacteus* W.W.Sm.	*Rosaceae*	1
59	*Cretaeggus oxycantha* L. 'Coccinea Plena' (*Crataegus rhipidophylla* Gand.)	*Rosaceae*	5
60	*Cryptomeria japonica* (Thunb. ex L.f.) D.Don 'Globosa Nana'	*Cupressaceae*	13
61	× *Cupressocyparis leylandii* (A.B.Jacks. & Dallim.) Dallim. (*Cupressus* × *leylandii* A.B.Jacks. & Dallim.)	*Cupressaceae*	86
62	*Cupressus arizonica* Greene	*Cupressaceae*	29
63	*Cupressus arizonica* Greene 'Conica'	*Cupressaceae*	5
64	*Cupressus macrocarpa* Hartw. 'Gold Crest'	*Cupressaceae*	59
65	*Cupressus sempervirens* L. "Pyramidalis"	*Cupressaceae*	24

66	*Cupressus sempervirens* L. var. *Horizontalis* (Mill.) Loudon	*Cupressaceae*	6
67	*Cycas revoluta* Thunb.	*Cycadaceae*	6
68	*Diospyros kaki* L.f.	*Ebenaceae*	4
69	*Dracaena* sp.	*Asparagaceae*	11
70	*Elaeagnus angustifolia* L.	*Elaeagnaceae*	5
71	Elaeagnus × submacrophylla Servett. (*Elaeagnus x ebbingei Door.*)	*Elaeagnaceae*	3
72	*Eriobotrya japonica* (Thunb.) Lindl.	*Rosaceae*	1
73	*Euonymus alatus* (Thunb.) Siebold	*Celastraceae*	7
74	*Euonymus alatus* (Thunb.) Siebold 'Compactus'	*Celastraceae*	15
75	*Euonymus fortunei* (Turcz.) Hand.-Mazz. 'Emeraldn Gold'	*Celastraceae*	5
76	*Euonymus japonicus* Thunb. 'Aureomarginatus'	*Celastraceae*	38
77	*Euonymus japonicus* Thunb.	*Celastraceae*	40
78	*Fagus sylvatica* L. 'Purpurea Pendula'	*Fagaceae*	3
79	*Fagus sylvatica* L. 'Pendula'	*Fagaceae*	1
80	*Fagus sylvatica* L. 'Atropunicea'	*Fagaceae*	1
81	*Fatsia japonica* (Thunb.) Decne. & Planch.	*Araliaceae*	3
82	*Forsythia* x *intermedia* Zabel	*Oleaceae*	17
83	*Fraxinus angustifolia* Vahl	*Oleaceae*	6
84	*Fraxinus excelsior* L.	*Oleaceae*	3
85	*Fraxinus ornus* L.	*Oleaceae*	7
86	*Fraxinus* sp.	*Oleaceae*	1
87	*Gaura lindheimeri* Engelm. & A.Gray	*Onagraceae*	80
88	*Ginkgo biloba* L.	*Ginkgoaceae*	3
89	*Ginkgo biloba* 'Mariken'	*Ginkgoaceae*	3
90	*Grevillea juniperina* R.Br.	*Proteaceae*	9
91	*Hebe x franciscana* (Eastw.) Souster 'Variegata'	*Plantaginaceae*	45
92	*Hedera helix* L.	*Araliaceae*	140
93	*Hedera helix* L. 'Variegata'	*Araliaceae*	50
94	*Hibiscus rosa-sinensis* L.	*Malvaceae*	5
95	*Hibiscus syriacus* L.	*Malvaceae*	6
96	*Hydrangea macrophylla* (Thunb.) Ser.	*Hydrangeaceae*	90
97	*Hypericum calycinum* L.	*Hypericaceae*	15
98	*Ilex aquifolium* L. 'Variegatum'	*Aquifoliaceae*	8
99	*Ilex aquifolium* L. 'Argentea Marginata'	*Aquifoliaceae*	1
100	*Ilex* x 'Nellie R. Stevens'	*Aquifoliaceae*	2
101	*Jasminum officinale* L.	*Oleaceae*	80
102	*Juglans regia* L.	*Juglandaceae*	6
103	*Juniperus communis* L. 'Compressa'	*Cupressaceae*	12
104	*Juniperus communis* L. 'Hybernica'	*Cupressaceae*	12
105	*Juniperus horizontalis* Moench	*Cupressaceae*	49
106	*Juniperus horizontalis* Moench 'Wiltonii'	*Cupressaceae*	5
107	*Juniperus sabina* L.	*Cupressaceae*	20
108	*Juniperus* sp.	*Cupressaceae*	3
109	*Juniperus squamata* Buch.-Ham. ex D.Don	*Cupressaceae*	9

110	*Juniperus virginiana* L. 'Skyrocket'	*Cupressaceae*	4
111	*Kerria japonica* (L.) DC.	*Rosaceae*	3
112	*Koelreuteria paniculata* Laxm.	*Sapindaceae*	6
113	*Lagerstroemia indica* L.	*Lythraceae*	15
114	*Lauracerasus officinalis* M.Roem. (*Prunus laurocerasus* L.)	*Rosaceae*	1
115	*Laurus nobilis* L.	*Lauraceae*	45
116	*Lavandula angustifolia* Mill.	*Lamiaceae*	50
117	*Ligustrum japonicum* Thunb.	*Oleaceae*	105
118	*Ligustrum japonicum* Thunb. 'Excelsum Superbum'	*Oleaceae*	15
119	*Ligustrum japonicum* Thunb. 'Aureum'	*Oleaceae*	5
120	*Ligustrum ovalifolium* Hassk. 'Aureum'	*Oleaceae*	15
121	*Liquidambar styraciflua* L.	*Altingiaceae*	9
122	*Liquidambar orientalis* Mill.	*Altingiaceae*	1
123	*Liriodendron tulipifera* L.	*Magnoliaceae*	3
124	*Lonicera japonica* Thunb.	*Caprifoliaceae*	70
125	*Lonicera nitida* E.H. Wilson (*Lonicera ligustrina* var. *yunnanensis* Franch.)	*Caprifoliaceae*	30
126	*Lonicera tatarica* L.	*Caprifoliaceae*	3
127	*Loropetalum chinense* (R. Br.) Oliv.	*Hamamelidaceae*	1
128	*Magnolia grandiflora* L.	*Magnoliaceae*	2
129	*Magnolia grandiflora* 'Gallisoniensis'	*Magnoliaceae*	5
130	*Magnolia* × *soulangeana* Soul.-Bod.	*Magnoliaceae*	6
131	*Mahonia* × *media* C.D.Brickell	*Berberidaceae*	3
132	*Mahonia aquifolium* (Pursh) Nutt. (*Berberis aquifolium* Pursh)	*Berberidaceae*	21
133	*Malus floribunda* Siebold ex Van Houtte	*Rosaceae*	36
134	*Malus floribunda* 'Pendula'	*Rosaceae*	8
135	*Malus floribunda* 'Atropurpurea'	*Rosaceae*	25
136	*Malus* sp.	*Rosaceae*	3
137	*Morus rubra* L. 'Pendula'	*Moraceae*	15
138	*Morus* sp.	*Moraceae*	3
139	*Nandina domestica* Thunb.	*Berberidaceae*	5
140	*Nerium oleander* L.	*Apocynaceae*	6
141	*Olea europaea* L.	*Oleaceae*	5
142	*Parthenocissus quinquefolia* (L.) Planch.	*Vitaceae*	120
143	*Paulownia tomentosa* Steud.	*Paulowniaceae*	4
144	*Phoenix* sp.	*Arecaceae*	1
145	*Photinia x fraseri* Dress 'Red Robin Nana'	*Rosaceae*	3
146	*Photinia* x *fraseri* Dress 'Red Robin'	*Rosaceae*	216
147	*Picea abies* (L.) H.Karst.	*Pinaceae*	2
148	*Picea glauca* (Moench) Voss 'Conica'	*Pinaceae*	5
149	*Picea orientalis* (L.) Peterm.	*Pinaceae*	5
150	*Picea pungens* Engelm. 'Glauca Globosa'	*Pinaceae*	5
151	*Picea pungens* Engelm. 'Glauca'	*Pinaceae*	12
152	*Pinus mugo* Turra	*Pinaceae*	4
153	*Pinus pinea* L.	*Pinaceae*	11

154	*Pinus strobus* L. 'Nana'	*Pinaceae*	2
155	*Pinus sylvestris* L.	*Pinaceae*	13
156	*Pinus sylvestris* L. 'Glauca Fastigiata'	*Pinaceae*	4
157	*Pittosporum tobira* (Thunb.) W.T.Aiton 'Nana'	*Pittosporaceae*	77
158	*Pittosporum tobira* (Thunb.) W.T.Aiton 'Variegata'	*Pittosporaceae*	19
159	*Platanus orientalis* L.	*Platanaceae*	17
160	*Platycladus orientalis* (L.) Franco	*Cupressaceae*	85
161	*Platycladus orientalis* 'Aurea'	*Cupressaceae*	10
162	*Podocarpus macrophyllus* (Thunb.) Sweet	*Podocarpaceae*	5
163	*Populus nigra* L.	*Salicaceae*	1
164	*Prunus cerasifera* Ehrh. 'Atropurpurea'	*Rosaceae*	19
165	*Prunus domestica* L.	*Rosaceae*	1
166	*Prunus serrulata* Lindl. 'Kanzan'	*Rosaceae*	23
167	*Prunus* sp.	*Rosaceae*	3
168	*Pseudotsuga menziesii* (Mirb.) Franco var. *viridis*	*Pinaceae*	1
169	*Punica granatum* L.	*Lythraceae*	21
170	*Pyracantha coccinea* M.Roem.	*Rosaceae*	30
171	*Pyrus calleryana* Decne. 'Chanticleer'	*Rosaceae*	21
172	*Pyrus communis* L.	*Rosaceae*	3
173	*Quercus ilex* L.	*Fagaceae*	22
174	*Quercus rubra* L.	*Fagaceae*	4
175	*Rhus typhina* L.	*Anacardiaceae*	5
176	*Rosa meilland*	*Rosaceae*	240
177	*Rosa* sp.	*Rosaceae*	90
178	*Rosmarinus officinalis* L.	*Lamiaceae*	30
179	*Salix caprea* L. 'Pendula'	*Salicaceae*	6
180	*Salix matsudana* Koidz var. *tortuosa* Rehd.	*Salicaceae*	4
181	*Santolina chamaecyparissus* L.	*Compositae*	63
182	*Sophora japonica* L. 'Pendula' (*Styphnolobium japonicum* (L.) Schott)	*Leguminosae*	1
183	*Sorbus aucuparia* L.	*Rosaceae*	15
184	*Spiraea* x *vanhouttei* (Briot) Zabel	*Rosaceae*	26
185	*Symphoricarpos albus* (L.) S.F.Blake	*Caprifoliaceae*	1
186	*Syringa vulgaris* L.	*Oleaceae*	17
187	*Tamarix tetrandra* Pall. ex M.Bieb.	*Tamaricaceae*	5
188	*Taxus baccata*L.	*Taxaceae*	6
189	*Taxus baccata* L. 'Fastigiata'	*Taxaceae*	13
190	*Thuja occidentalis* L.	*Cupressaceae*	25
191	*Thuja occidentalis* L. 'Rheingold'	*Cupressaceae*	36
192	*Thuja occidentalis* L. 'Danica'	*Cupressaceae*	15
193	*Thuja orientalis* L. 'Pyramidalis Aurea'	*Cupressaceae*	6
194	*Tilia cordata* Mill.	*Malvaceae*	2
195	*Tilia platyphyllos* Scop.	*Malvaceae*	16
196	*Tilia* sp.	*Malvaceae*	1
197	*Tilia tomentosa* Moench	*Malvaceae*	26
198	*Ulmus glabra* Huds. 'Pendula'	*Ulmaceae*	1
199	*Viburnum lucidum* Mill.	*Adoxaceae*	12

200	*Viburnum opulus* L.	*Adoxaceae*	24
201	*Viburnum tinus* L.	*Adoxaceae*	100
202	*Weigela floribunda* C.A.Mey.	*Caprifoliaceae*	50
203	*Wisteria sinensis* (Sims) Sweet	*Leguminosae*	150
204	*Yucca filamentosa* L.	*Asparagaceae*	19
205	*Yucca gloriosa* L.	*Asparagaceae*	6

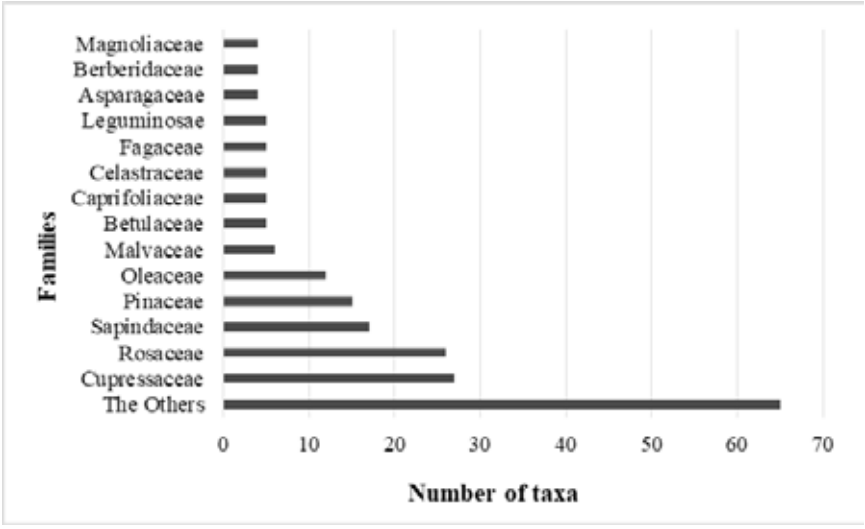

Figure 3. The families of the taxa

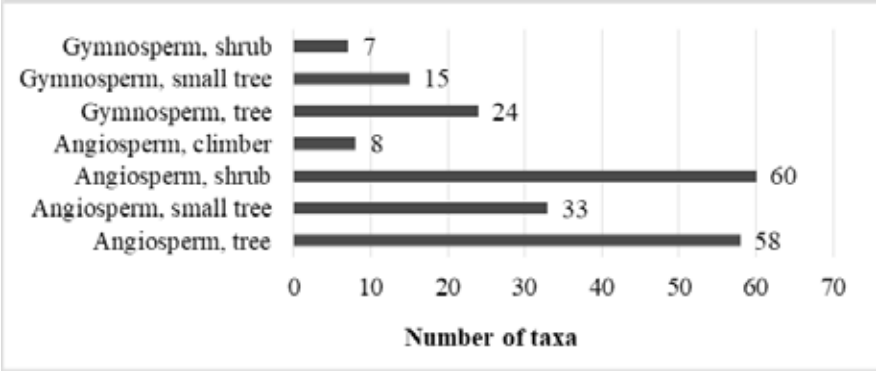

Figure 4. The growth forms of the taxa

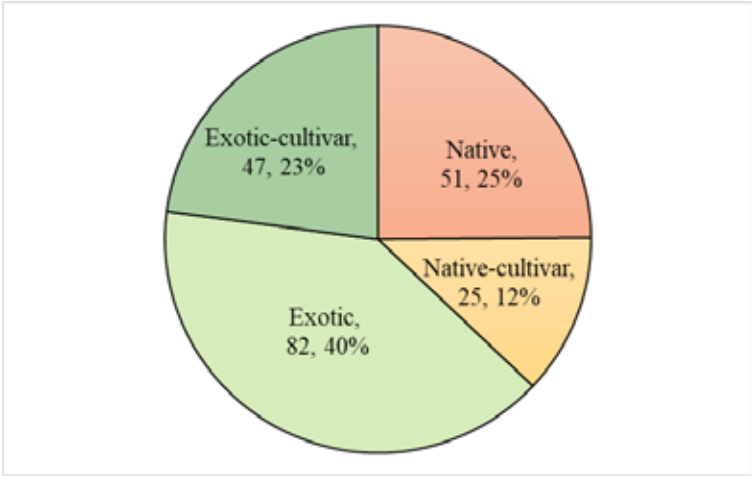

Figure 5. The exotic to domestic ratio of the campus plant species

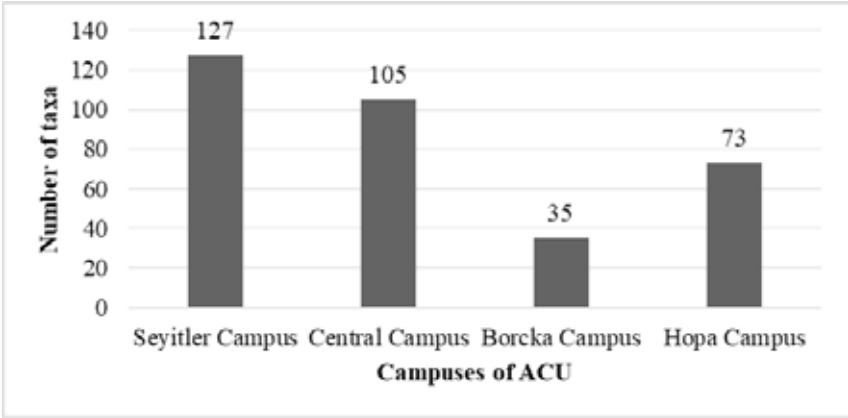

Figure 6. The distribution of the plant taxa in ACU campuses

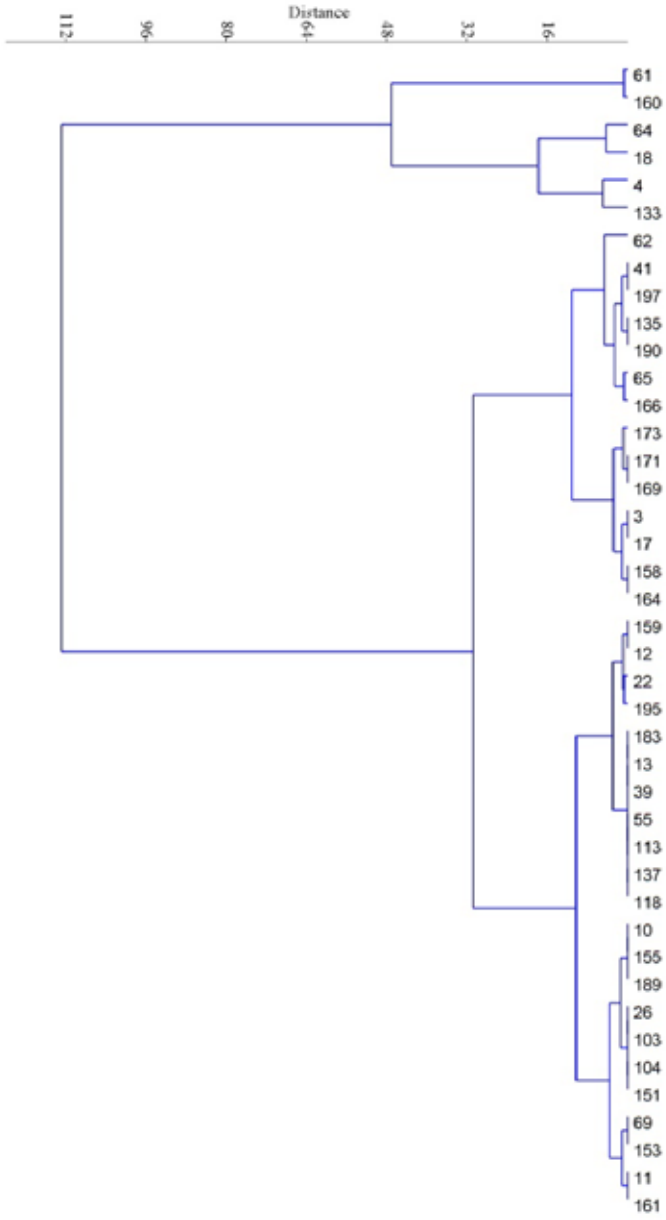

Figure 7. The dendrogram for the tree and bush counts in the campuses (includes the count of the taxa that were 10 or over. The taxon count is available in Table 1)

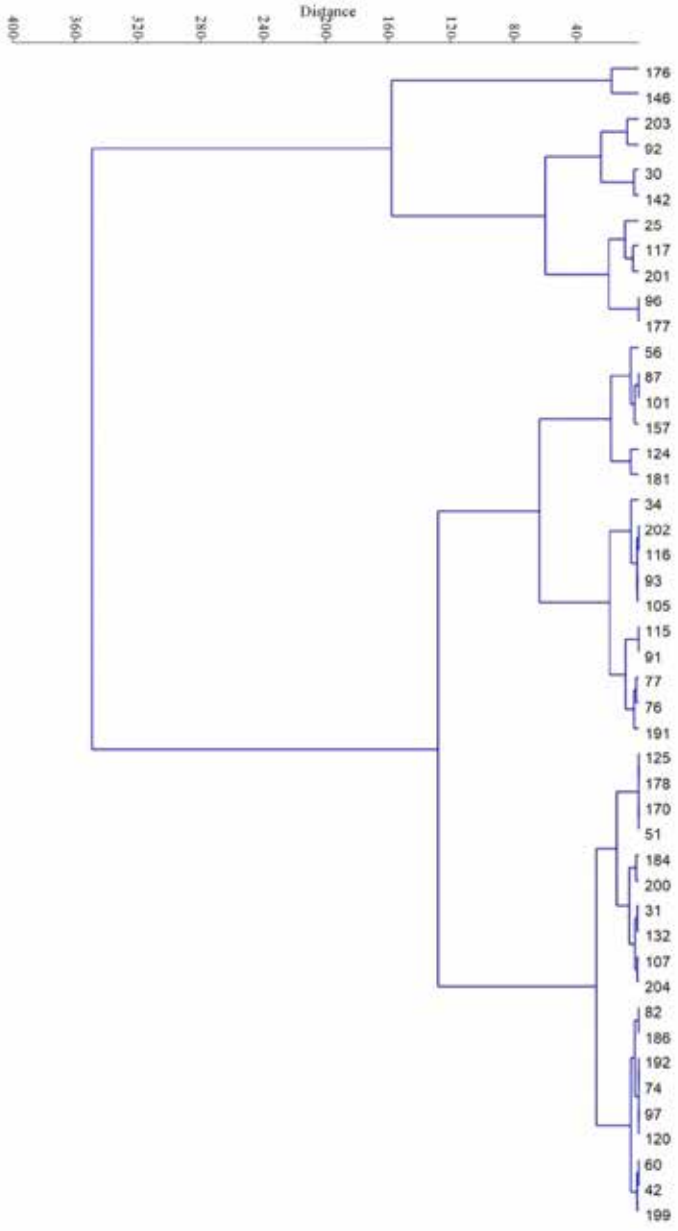

Figure 8. The dendrogram for the shrub and creeper counts in the campuses (includes the count of the taxa that were 10 or over. The taxon count is available in Table 1)

DISCUSSION AND CONCLUSION

Various floristic studies conducted in university campuses reported that the species diversity was high in the campuses (Singh, 2011; Struwe et al. 2014; Nerlekar et al. 2016; Dar, 2019). Turkish campuses also had rich plant species diversity that includes cultivars and endemic species (Güler, 2019).

The present study findings demonstrated that there were a total of 205 taxa including trees, shrubs, creeper and climber species in ACU campuses. Although most of these taxa were exotic, certain domestic plant species were also observed. Güler (2019) reported the average species diversity in 31 Turkish universities was 328 in a comprehensive study. The total number of only woody taxa in ACU campuses was determined as 205. Thus, a very high species richness could be recorded when herbaceous taxa (e.g., annuals, perennials and succulents) would be included in the study. On the other hand, the total species richness is closely associated with the campus area, and planted species richness is closely associated with the age of the campus (Güler, 2019). It was observed that there was a positive correlation between the size of the campus area and species richness in ACU campuses. Furthermore, it could be suggested that the 10 years old ACU campuses will have a more significant floristic diversity potential in the future. Thus, it is important to analyze this potential wisely.

It was determined that the plant species employed in ACU were generally suitable for the ecological conditions of the area, aesthetical and functional plants were employed based on occupant needs and the plant-space relationship, the design included edible landscape plants; however there were infrastructure and maintenance problems. Based on the land use in the campuses, the adoption of planting designs compatible with the needs, efficiency and spatial construct, and effective in all four seasons based on possible climate change scenarios, and the preference of domestic and exotic species suitable for the region and require less maintenance are important issues that should be considered in planning and design.

One of the targets in urban landscape design is to construct a balanced relationship between humans and nature and to simulate the natural environment in urban settings (Sarı & Karaşah, 2018). Plants, which play a key role in the development of a sustainable landscape and support of the green infrastructure, are indispensable elements of the urban landscape. The employment of ornamental taxa in campus planting improves the floristic diversity in campuses. The employment of novel and different taxa could encourage the use of campuses as botanical gardens. Thus, campus areas could contribute to the value of the urban ecosystem by developing valuable areas not only in floristic diversity but also in biodiversity. In this sense, ACU has significant contributions to the floristic diversity in the city due to the taxon diversity in the campuses.

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Chapter 8

RENOVATION OF ARTVIN MARTYRDOM GRAVE MONUMENT

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INTRODUCTION

The article includes proposal designs for the "Artvin Martyrdom Tomb" monument, which is requested by the Artvin Municipality for renovation. The main purpose of the designs is to eliminate the deficiencies of the existing monument and to give a new identity to the area. The main principle used in the designs is to create a memorial martyrdom platform, to ensure its harmony with its physically close environment, to establish its relation with an effective location, history, cognition and meaning. With the proposed monument designs, it is aimed to associate the traces of heroism, the landscape in which the cemetery is located and the social memory of the past. A single idea to symbolize the glory of martyrdom in order to honor the memory of the martyrs was developed with three different design approaches: 1. Living monument and epic, 2. Unbreakable roots and 3. Resistance to time. With this study, it was tried to increase its effect on the visitor memory by providing the necessary importance to the martyr cemeteries, which symbolize the important pains and bad days in the memory of Turkish society.

1. THE RELATIONSHIP OF MARTYR CEMETERIES WITH LANDSCAPE

The feelings that are tried to be kept alive with the landscape elements and patterns created by the monuments used in the martyrdom tombs gather people of the same history at one point and give meaning to both the place and the landscape. In the history of Turkish martyrdom design, which has a history of about 100 years, generally, both physically and schematically, designs that are disconnected from the environment and context, introverted, weak or mostly lost in the meaning relationship are established with the place where it is located (Özel, 2013: 536). However, in today's architectural design approaches, the monument designs made to commemorate the martyrs have begun to be glorified, and the physical environment close to the martyr cemeteries has begun to be associated with memory and meaning. This situation has gradually become an indispensable design guide for martyrs and memorial cemeteries. However, for our country, it is not possible to construct the relationship between the place of martyrdom and martyr cemeteries in terms of landscape. Every blood shed for the freedom of our country is shed by Mehmetciks who grow up in different lands of our country. Therefore, there is a martyrdom cemetery all over our country. All of these cemeteries symbolize the blood shed to us at different times and symbolize the painful memories in the memories of each citizen as well as the families of the martyrs.

Monuments (sculptures) used in open spaces symbolize important events or situations in the lives of individuals and societies and play

important roles in the formation of a common memory and urban consciousness, and establish different dialogues with their surroundings in this context. In the historical development process, the roles undertaken by the open space monuments differed with the changing social dynamics (Öztürk Kurtaslan, 2011: 81). The importance Turks attach to grave monuments is an extension of the belief in death that dates back to pre-Islamic times. There are many grave monuments built independently in the integrity of Turkish art. In addition to this, there have been a lot of works built with other buildings or a kulliye since the early ages. It is possible to see the "belief in the hereafter" in Islam as the main reason for associating the tomb monument with another building (Aksoy Demircan, 2015: 488).

Monument is a symbolic structure that can be perceived in the physical environment where it is built to be remembered for future generations. For this reason, every monument areas built are used by many countries and nations for commemoration ceremonies. The physical environmental conditions in which the monument is located should be designed in accordance with the memorial ceremonies as well as highlighting the monument. The uses in the form of a ceremony area that come to the fore during the design phase are on which ceremony days, who and how many people will be used. When the monument design, which is considered with its surroundings, is evaluated by considering these approaches, it is seen that the space is more sustainable (Uslu, 2010: 1043). It should not be forgotten that the ceremonial areas, like squares, are defined as surrounded areas with certain boundaries, where people come together and engage in social activities, and are shaped in accordance with the general characteristics of the city (Taşcıoğlu et al. 2019: 246).

In the study of Özel (2016: 84), in the space setup made with the image of the outer mass of the Saint Klaus Chapel, he stated that the interior life is a tradition of architecture, and the relationship with the temple is tightly established (Özel, 2016: 84). Çanakkale was the front where the Ottoman Empire gave the most martyrs (Esenkaya, 2010: 42). While recent political and sociocultural developments have strengthened Gallipoli's presence in Turkish history and national consciousness (Sınmaz Sonmaz, 2015: 186), it has also been instrumental in the creation of an alternative Islamic myth (with the accompanying discussions) (Uyar, 2016: 167). So constructing a monument befitting martyrs in Çanakkale has become a subject which has constantly preoccupied the agenda of Turkey, yet the First World War and the monument made under difficult conditions and limited facilities of the National Struggle period has remained relatively modest (Sarısaman, 2016: 96). The first serious attempt for the monument was the project competition organized by the Ministry of National Defense in 1944 (Atabay, 2014: 48). The monument built for Turkish soldiers who

were martyred during the Çanakkale Wars is also easily perceptible from a wide perspective. Although the part of Abide, which is heavily visited by visitors, and its immediate surroundings are well-maintained, the tombs in its distant surroundings are quite neglected (Ak and Akıncı Kesim, 2013: 42).

Throughout history, Turkish society has begun to shape the effects of war in line with belief by recording events and ruptures. As in our society, wars have had various effects especially on culture and art (Demir et al. 2016: 18). The effects of wars have been tried to be displayed in many countries with various works. As Behbahani et al (2013: 9) mentioned, based on this effect of wars on societies, the gardens known as "memorial gardens" have started to be planned in the world in order to symbolize and remember the continuity of the values experienced. Conflicts experienced for the defense of the country at different times are as effective as wars that play an important role in the historical scenes. Lives lost in these conflicts have caused many negative effects on society. Each soul given in the name of stability, brotherhood and sacrifice takes its place in the concept of martyrdom. In the field of literature and art, it is frequently used by artists to convey these periodic feelings to the public. In landscape architecture, it is possible to keep these feelings alive with martyr cemeteries, memorial gardens and monuments. The need to create this effect has started to be preferred frequently in today's conditions.

2. MARTYRS MEMORIAL CONSTRUCTED AS A MONUMENT

Located in the city center of Artvin, the monument is located at the entrance of the martyrdom cemetery and is very close to Artvin State Hospital. The first martyr burial in the cemetery was in 1992. In the cemetery, which has a large area, there are mainly *Cupressus arizonica, Thuja pilicata, Pinus sylvestris* and *Cedrus deodora* trees. Since planting design criteria are not used in the application of existing trees, a cemetery is not seen as a green area (Figure 1). Artvin martyrdom cemetery is a very strategic point for both Artvin residents and visitors as it is located at the junction point of three roads. Although the monument work done in 2017 could not reflect the quality of the space, it could not establish a memory and meaning relationship on people (Dönmez and Türkmen, 2015:15). In fact, in order to meet the increasing needs and demands of people over time, it is necessary to establish human-environment relationships without forcing natural relationships and balances (Eroğlu et al., 2005: 272). Artvin martyrdom cemetery cannot attract the attention of visitors as the spatial continuity cannot be achieved in the monument design. The most important reasons for this are that the entrance point of the martyrdom cemetery, which is designed with unqualified design approaches, is not

emphasized, the attention of the visitors is drawn to the billboards, the entrance is used as a parking lot, the green area is neglected and the stairs used in accessibility are not in compliance with the standards. However, the use of sculptures and monuments in the city should be considered together (Şahin et al., 2019: 63). The relations of the monument in Artvin martyrdom cemetery with its surroundings are mostly incomplete because it is placed without any contact with the environment.

Fig 1. *Artvin martyrdom cemetery*

As the ineffective designs in the cemetery began to be felt by the Municipality of Artvin, various solutions were sought. The most important point in this search for solutions is the reception area in the cemetery. Considering the designs made in landscape architecture, it is seen that the reception areas are extremely important. This situation is particularly striking for such unsolved areas of a high moral value. Random car parks, billboards and stairs in the welcome area are indicative of this. The fact that these deficiencies attract the attention of the local administrations as well as the public brought the necessity of redesigning the martyrdom. Thus, the first step towards the design was taken and firstly the lack of use of the stairs and the wall Frenxi in the reception area were discussed.

The designs made in martyrdom tombs and memorial gardens are shaped in line with the beliefs of a nation. With this study, the relationship between the monument and the nation will be established and the environmental design will be positively affected. The forms and texture differences used in each of the proposed designs have certain features and have the appropriate qualities for the same area. Each proposed design will provide different visual and sensory experiences for visitors. In addition, the designs were tried to be enriched by using plants instead of artificial elements. Artificial materials whose effect can be felt in different seasons are used in a way to facilitate movement. With the designs discussed in the study, new design proposals for small spaces have been developed.

3 MONUMENT WORKS IN ARTVİN MARTYRS MEMORIAL

A human being tries to organize and maintain his/her life with environmental elements. The important thing here is to be able to do that without alienating and disfiguring the environment. Considering both ways as a solution proposal, people try to convey the technological changes based on today's living conditions as permanent definitions of the environment (Demirkalp, 2008: 113; Kahveci and Hergül, 2019: 304). In the designs made, unqualified areas around the space were organized and a design that adds meaning to the space (Özel, 1998: 43) was tried to be created. By creating a "landmark" character, one of the qualities defined by Kevin Lynch (1960: 42), "Traces in memory" were tried to be reflected. These spaces will be shaped by the effect of the period and place they are in over time (Bekci et al., 2013a: 871). As Sancar and Acar (2016: 59) mentioned, urban designs will eventually become the city's most important haunt. Designs that have undergone transformation and change over time have actually affected the spatial quality of the city by contributing to the city and its users in terms of social-cultural-functional and visual aspects (Acarlı et al., 2018: 29). Developments shaped as a response to current needs in the urban space must ensure the sustainability of ecological, historical and cultural values by preserving the original quality of the space (Bogenç, 2019: 45).

It shapes the displacement of people on the streets as well as in recreational areas. These areas with high dynamic energy form an important complementary element of business and home life together by providing movement space, creating communication points, creating common spaces for recreation (Carr et al., 1995: 289). Designing ecological prioritized, qualified, functional and aesthetic open green areas in urban areas as well as in rural areas will be only possible with the correct and complete implementation of the landscape planning and design process. Environmental design projects carried out without paying attention to

every stage of this planning and design process cannot be expected to produce successful results (Şişman et al., 2008: 119). Artworks taking place in urban spaces reflect the problems of the society and have a holistic structure that enables the transmission of cultural accumulations, the integration of the city with its environment, and the integration of the city and the environment. Outdoor sculptures are plastic elements that play a major role in the formation of a contemporary environment (Güç, 2005: 36).

The design of the Artvin martyrdom monument was started to be designed based on the thoughts it created in the landscape and memories (Bogenç and Sabaz, 2018: 1543). Considering that Artvin martyrs did not have a connection with the cemetery (not the place where they were martyred), the design fiction was created by considering the social memory. Three different suggestions have been developed by relating the most important approach in designs to memory. The previously used monuments and visuals in the literature were used in the suggestions developed. These selected images will be reconsidered by local administrators and sculptors in the application phase, and will be shaped with the symbolic values of the region. The three different design approaches discussed in the study are as follows (Table 1).

Table 1. *The monument designs created for the cemetary grave*

		
1. Living monument and epic	**2. Resistance to time**	**3. Unbreakable roots**
The most important reason for choosing the living monument and epic is to be able to carry the traces that make the history alive and live. The independence of the flag is used for our martyrs.	Symbolizing their resistance against time in the middle of the war, this work symbolizes the heavily paid costs and symbolizes the identity of the worn-out Turkish society and the existence in the cultural resource.	The study emphasizing that one Turkish soldier proudly carries his other martyred soldier friend with the crescent and star symbol used by the Turkish tribes and the writing “Turkish” in Göktürk language (old Turkish language) emphasizes the solid roots of the Turkish society.

The main purpose of the study is to create various interactions in the perception and memory of the visitors. For this reason, the place chosen

for the works is very important. The most important feature of the study area is that it is located at a strategic point for visitors. Design work in the field was quite ineffective and such a design was needed. For this reason, the wall frescoes recommended for the monument design were applied to the area. Designs are explained below.

In the concept of ***Living monument and epic*****,** the flag symbolizing the unity and solidarity of the Turkish nation in the concept of living monument and epic was used as the dominant element in the middle of the monument (Figure 2). To emphasize this unity, Turkish soldiers were used symmetrically on the right and left of the monument. The main purpose of the work is to attract the attention of people who visit Artvin martyr cemetery and turn this point into a dominant element in the field. In the work, the existing fountain was renewed and used in place, and the monument was supported with a herbal design. *Phornium cookianum*, *Lavandula angustifolia*, *Hosta plantaginea* and seasonal flowers were used in the herbal design.

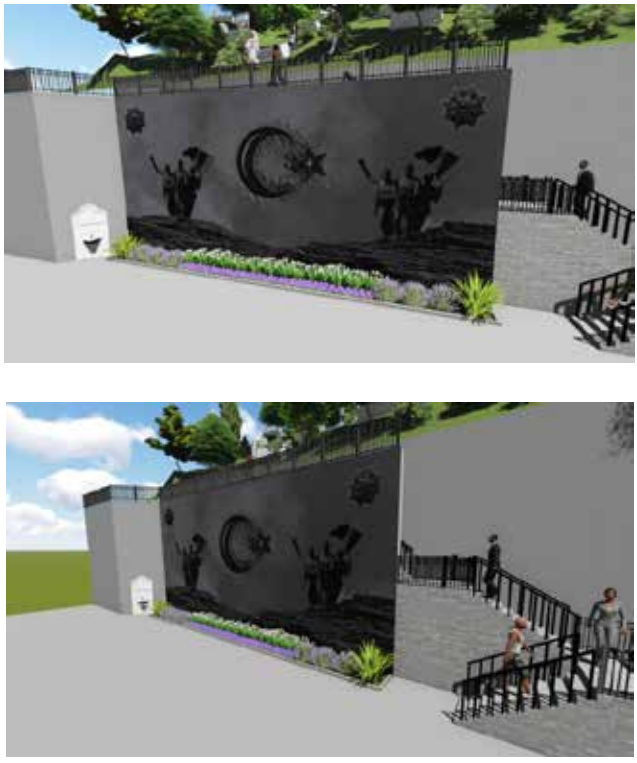

Fig 2. *Design symbolizing the concept of 'living monument and epic'*

In the design of ***Resistance to time*****,** emulation was made to the Çanakkale martyrdom for our soldiers who were martyred in various parts of the country. The current fountain was moved to the landing on the stairs

(Figure 3). In addition to the *Cupressus arizonica*, *Thuja pilicata*, *Pinus sylvestris* and *Cedrus deodora* plants in the martyrdom, a planting design was made for an emphasis on the front of the monument. *Hedera helix*, *Agave* sp., *Cortaderia selloana*, *Buxus sempervirens*, *Agave americana* and *Festuca arundinacea* were used in the planting design for emphasis.

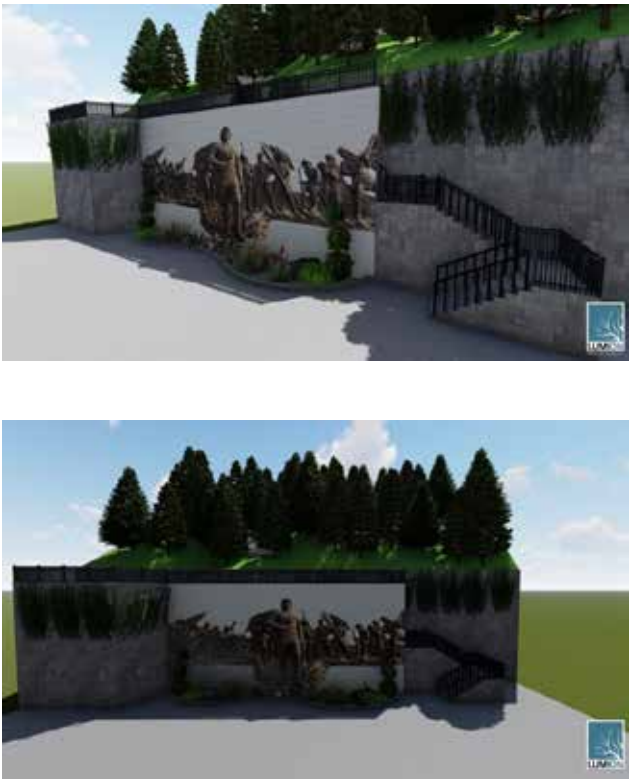

Fig 3. *Design symbolizing the concept of 'resistance to time'*

The design of unbreakable roots consists of the symbol of the Turkish tribes and symbolizing the word "Turkish" in the Göktürk language. The sacrifices of Turkish soldiers and their loyalty to their homeland are what the work aim to express. The main emphasis of the study is the figure of the Turkish soldier carrying his friend who was martyred. In order to feel this visually symbolized emotion more deeply by the visitors, the poem beginning with the verse "O, soldier fallen to the ground for this land!" written by Mehmet Akif Ersoy for the martyrs of Çanakkale was used on a black marble bust in the middle of the design (Figure 4). In this design approach prepared for the Artvin martyrdom cemetery, *Hedera helix*, *Picea orientalis* cv. Plants Nana, *Thuja orientalis* "Pyramidalis", *Thuja occidentalis* and *Buxus sempervirens* were used.

Fig 4. *Design symbolizing the concept of 'unbreakable roots'*

The variety of plant species used in the designs has been selected by taking into account the local viability and agricultural principles. The vegetative arrangements made in front of the monument are suitable for the planting design criteria in terms of landscape architecture. Herbal materials added to the design were used in the front of the monument and on the walls. Thus, an attempt was made to establish a relationship between living and non-living material. Thus, it was tried to benefit from the visual effect of the plants as well as the functionality effect. Along with the color and texture differences in the plants used, the monotony of the space was tried to be broken. The aesthetic value in design has been increased with the use of plants (Özkartal, 2016: 123).

In the designs, materials selected for the purpose were used. In the designs in which three dimensions and tactility are emphasized in the monuments, the ability to serve the open space is also prioritized. The purpose of design is to positively affect the lives of individuals in terms of aesthetics and to make sense of public spaces. The fact that the monuments used in urban open spaces should be designed in line with certain principles in order to fulfill the functions expected from them (Ak and Akıncı Kesim, 2013: 38) is the most important factor that has been

taken into consideration from the beginning of the study. How sensitive the place where the monument is placed is for our nation has been effective at every stage of the work.

CONCLUSION AND RECOMMENDATIONS

The idea of building a magnificent monument worthy of our martyrs has always preserved its vitality due to the process of reaching the level of happiness that has been going on for centuries in our country. Although there are efforts to create memorials and cemeteries in martyrdom cemeteries within the means of local governments, satisfactory designs are not encountered in the long term. However, the sensitivity of the people to this issue has led them to take steps towards making improvements in the cemeteries of martyrdom today. For the martyrdom monument that is planned to be built, support should be obtained not only from local governments but also from all Turkish citizens. When deemed necessary, public support should be sought by organizing aid campaigns (projects involving different supports). The public will not remain indifferent to this desired support. Thus, with an aid campaign to be organized, the national unity and solidarity shares of the people will be renewed again. This situation will strengthen national unity and solidarity.

The tradition of building monumental tombs for people who have been mentioned with their lives and important events during their lifetime, on the other hand, dates back to ancient times. The most important feature of monumental tombs that distinguish them from other tombs or cemeteries is that they were built for a special person and contain more spectacular structural and herbal materials (Haseki, 1977: 56). Most of the commemoration and victory celebrations held in the ceremonial areas, including the martyr cemeteries, are carried out in the organization of official institutions, various societies and non-governmental organizations, with the participation of the administrators of the period, parliamentarians and the public. Especially the activities held in the Çanakkale Victory strengthened the victory gained in the memory of the Turkish society. In this process, great importance is attached to the Çanakkale Wars in terms of creating historical awareness and ensuring national unity and solidarity. As a matter of fact, Çanakkale Victory has gradually become a symbol in strengthening national identity and reinforcing the sense of heroism (Sınmaz Sönmez, 2015: 174).

One of the most important features of martyrdoms is to raise awareness by giving educational lessons about history. In addition, it ensures that the sad events and people in history are transferred to the society without being symbolized. It can form one of the elements in the urban identity by positively affecting the degree of spirituality of the people. With these design elements shaped according to the cultural and

traditional characteristics of the local people, visitors connect spiritually to those who lost their lives and experience immortality (Demir et al., 2016: 14). Martyrdom graves are frequently visited by people, especially on religious holidays. For this reason, attention should be paid to religious, historical and cultural issues. The visits of the public play an important role in the formation of social and cultural continuity of the society.

The area where the monument was built and its immediate surroundings have been used only for access from past to present. With these designs, which aim to create a strong and positive effect on the area, the Artvin martyrdom cemetery will be given an identity and it will be ensured that the visitors have a place in their memory. The feelings that are desired to be created in the local people are to create a sense of "place" and "belonging" between the space and the individual by creating a strong bond in the space (Türkmen and Dönmez, 2015: 202). The high height of the place where the monument will be built will affect this effect positively.

Cities, which contain architectural patterns, environmental conditions and social relations as a whole, are places where the culture of the country is reflected in the best way (Bekci et al., 2013b: 871). The landscapes and architectural identity of the cities will be enriched with monuments that will create "Architectural Artistic" that will enrich the urban texture. Instead of choosing ready-made architectural works, it is necessary to include architectural works that appeal to the landscape and emotion. The old should be rehabilitated instead of demolished or replaced if it does not have a symbolic quality. A wrong application needs to be transformed or renewed instead of keeping it alive in the field. Thus, the users' sensitivity and love to the environment will be positively affected.

Local authorities have been a determining factor in the regulation of built environments. With modernization works, urban architecture started to gain the necessary importance and faced positive results (Şat, 2017: 152). The image of the city should be enriched by using successful images in order to increase the readability in urban spaces. In most of the ceremonial and memorial gardens, the symbolic Atatürk monuments have not always been used correctly. By integrating with the environment of the monument, the aesthetic value and design rates should be adjusted well. It will be able to adapt to its environment only in this way.

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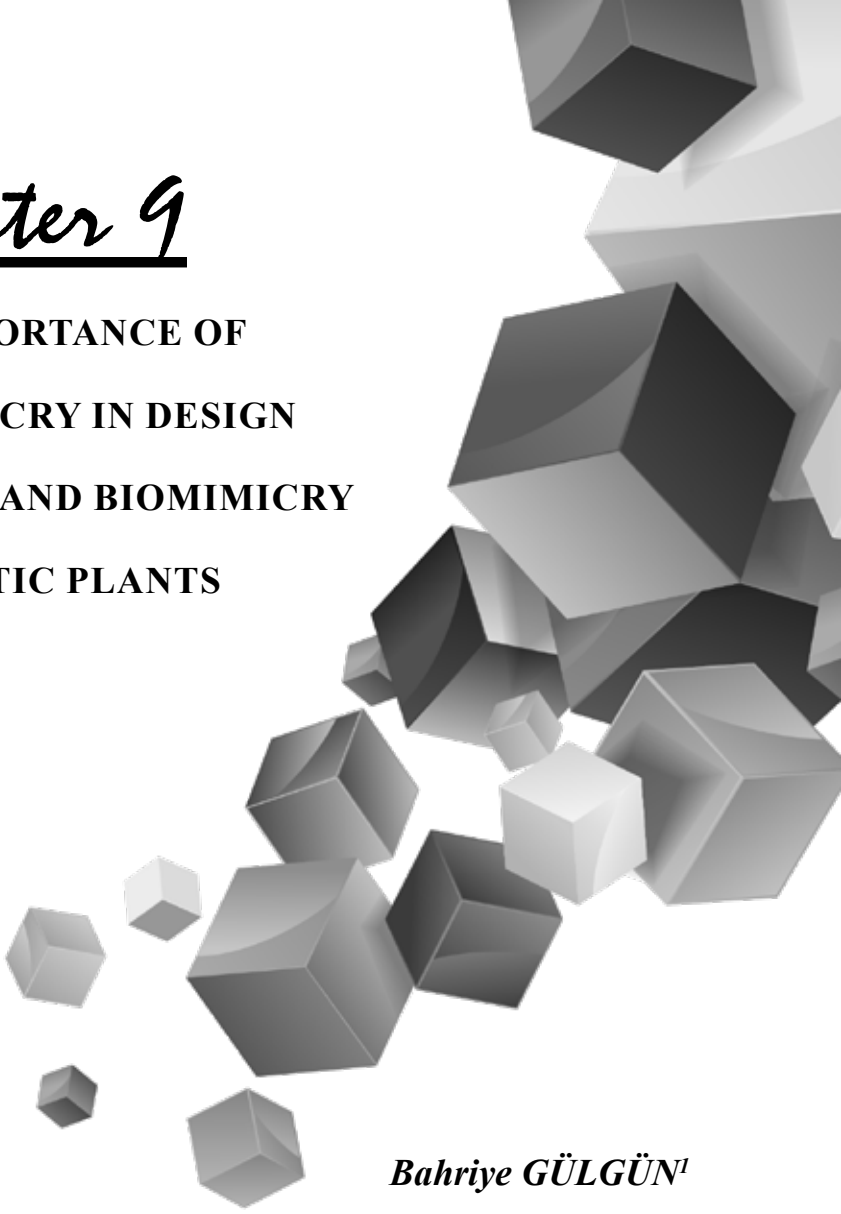
Chapter 9

THE IMPORTANCE OF BIOMIMICRY IN DESIGN STUDIES AND BIOMIMICRY IN AQUATIC PLANTS



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1. INTRODUCTION

Human beings were inspired by nature while founding the life that has been designed and maintained in harmony with nature for thousands of years (Gülgün et al., 2014). Technology and industry, which developed with the industrial revolution in the 19th century, deeply affected the physical and social environment in which people live and dragged them to radical changes (Gülgün et al., 2015; Gülgün et al., 2018a; Yazici and Gülgün, 2019). This change has begun to move away from natural habitat and to harm the natural environment by using rudely for the profit of humanity. Nature removed from the physical environment while modern cities were established, living spaces that turned into large solid construction of concrete and steel were created. The rapid growth of the industry caused an uncontrolled increase in the housing stock and population density. The energy consumed by buildings and vehicles causes the formation of heat islands in cities due to greenhouse gas emissions. In addition, people's daily activities using vehicles cause serious air pollution and the formation of dust domes (Tozam, 2018; Yazici and Unsal, 2019; Yazici and Arsşantaş Sağlamer, 2019). The pollution of urban environment negatively affect natural lighting and air quality in interior spaces, hence sufficient suitable conditions are not provided according to our needs(Akça and Yazici, 2017; Gülgün et al., 2018b). Gülgün As a result, our health is also negatively affected. The installation of necessary lighting and ventilation systems in buildings causes an increase in energy consumption, as well as increasing building construction costs, the continuity of efficient operation of the systems requires maintenance and repair. This situation inflates people the financial budget they need to sustain their lives and makes their living spaces artificial.

Scientists and designers have started to examine nature again for the solution of the problems brought by modern life (Yazici and Gülgün, 2017; Akca et al., 2019). Nature has evolved and produced the most efficient solutions to survive against changing conditions for billions years. Nature is played an important role in the development of aesthetic and useful products which is a source of inspiration for many scientists and designers, that make our lives easier. Many studies and designs, which have gained momentum in recent times, examine the relationship and interaction of organisms with nature. By mimicking the mechanisms that sustain life and textures allow new technologies to be developed (Kim and Park, 2018). These technologies play a key role in the sustainability of structures or products and are intended to be environmentally friendly.

Biologists, physicists, engineers and designers develop advanced technologies through biomimicry in cooperation with the aim of preventing environmental pollution, which is the most important problem of today.

From city planning to the working principle of a robot working on the production line of a factory, biomimicry technologies and designs are developed by imitating the working principles of nature. As a result of the changes in ecosystems in the world, the depletion of energy resources and the decrease in biological diversity, every day people's need for environmentally friendly sustainable structures and spaces by creating a harmony with nature again is emphasized. The eco-architectural approach that has developed in this process aims to examine the functioning mechanisms of natural ecosystems, designing environmentally friendly structures, saving energy and resources, and organic relationship for human health and comfort (Kim & Park, 2018).

2. METHODOLOGY AND LITERATURE REWİEV

The method used in this article is purely qualitative and is mainly based on document research. It included a review of relevant literature from GoogleSchoolar, ScienceDirect, ResearchGate, and various architecture and design publishing tools, journal articles, theses, books, and other online data sources.

There are many sources of inspiration where designers find numerous solutions to various challenging problems. Biomimicry, a comprehensive study of plants, animals, and other living organisms to understand their working mechanisms and ways of dealing with environmental challenges, has become a current trend followed by many designers.

Various literature studies have been examined, and the approaches in which the biomimicry process is effective in design development are discussed. Based on the principles of sustainability, the methodologies applied to structures and systems are examined and exemplified. Considering the problems caused by environmental pollution and climate change, it has been tried to create a projection for future research and designs.

3. BIOMIMICRY AND AQUATIC PLANTS

3.1. Definition and Principles of Biomimicry

Biomimicry is the science and art of imitating nature's biological mechanisms to solve system problems which has a potential to research any within any animals, plants, microorganisms and every living creature. Nature has evolved over millions years to develop optimum protection and adaptation mechanisms against changing environmental conditions and is the best resource for learning adaptation. Therefore thermodynamic, aerodynamic and optical mechanisms developed by living things in the adaptation process are the most efficient and sustainable systems (Al-

Obaidi, Azzam Ismail, Hussein, & Abdul Rahman, 2017). In order to solve the problems that arise in the technologies, which is produced today or to increase efficiency and using these mechanisms in nature as a source of inspiration by imitating their form, structure, functions or process (Uçar, 2019).

The concept of biomimicry was introduced into the literature by the biologist Janine Benyus in the 1990s, and Benyus is also one of the founding partners of the Biomimicry Institute ("Janine Benyus – Biomimicry Institute," n.d.). Although biomimicry is a new terminology today, it has been applied by many artists and inventors for hundreds of years. The best example that can be given based on old times is Leonardo Da Vinci. Plans and drawings of making flying machines, inspired by birds, have survived to the present day (Fig. 1) and laid the foundations of the technology that enables us to travel to overseas places in a short time (Hanley, 2015).

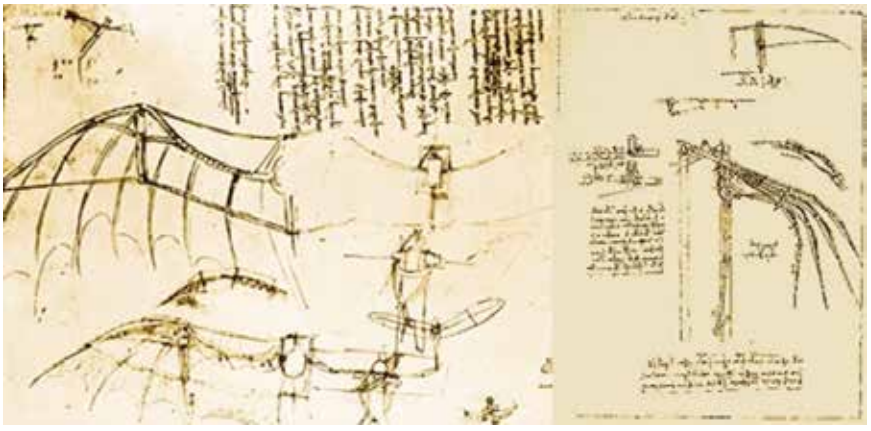

Figure 1: Mechanical Wing, Leonardo Da Vinci (Hanley, 2015)

Designers follow two types of paths in building designs or technologies developed by using biomimicry methodology; first one is the problem-based approach model, second one is the solution-based approach model (El-Zeiny, 2012). In the problem-based approach model; To solve a problem in design, biological conditions in nature are investigated and the mechanism to be imitated is transferred within the framework of sustainability through abstraction (Uçar, 2019). As shown in Figure 2, the initial goals and parameters are managed effectively by defining the problem in the design.

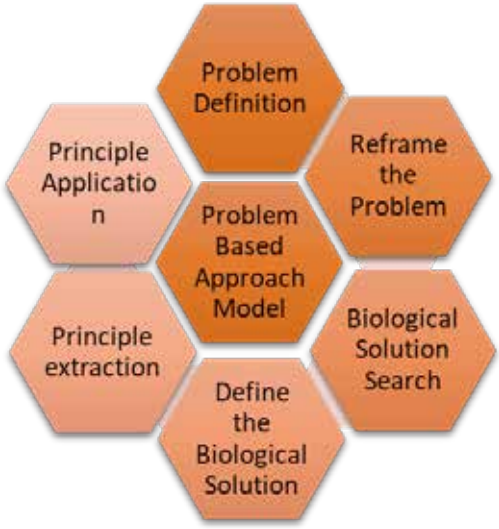

Figure 2: Problem Based Approach Model Diagram

The second approach model is the solution-based approach. As shown in Figure 3, a design problem is reached by starting from a mechanism whose biological research is made and defined. The determined solution leads to the design. The problem-based approach model provides efficiency, comfort or durability to the design; the solution-based approach model provides inventing new technologies as a source of inspiration for new ideas.

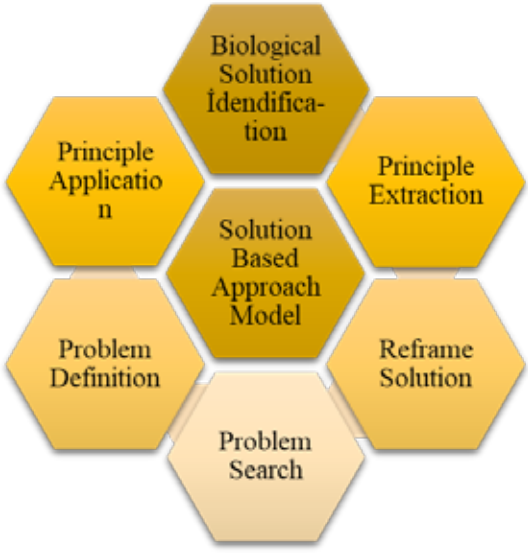

Figure 3: Solution Based Approach Model Diagram

Biomimicry does not mean the exact replication of the form, tissue or system when it comes to application as a methodology. In order to be biomimicry in building design, the mechanism mimiced from nature can minimize the energy need, has sustainability principles, and main aim is that the operation in nature give the same effect to the building (Lodson & Jahromi, 2018). It is possible to develop structure, material, form and production techniques by taking inspiration from nature through biomimicry, where functionality is at the forefront.

Beijing National Aquatic Center, known as Water Cube, was built between 2004-2007 for the 2008 Olympics. The building was designed by Chriss Boss, Tristam Carfrae, PTW Architects, CSCEC, CCDL and Arup (Uçar, 2019). The design concept of the building, inspired by soap bubbles, aimed to reduce the surface area and surface energy on the facade. The building shell consists of units that are sliced and repeating in a three-dimensional volume in space frame logic. As seen in Figure 4 and 5, although the frame's geometry is regular in itself, it has a random and organic appearance when viewed from the outside. In addition to the aesthetic appearance, 20% of the energy from the sun is retained, so artificial lighting is reduced by 55% and the energy costs are reduced by 30% (Radwan & Osama, 2016).

Figure 4:Water Cube ("Designing the National Aquatics Center (Water Cube) for Beijing Olympics 2008 - Arup," n.d.)

Figure 5: a)Water Cube Cephe Strüktürü b)Interior Space ("Designing the National Aquatics Center (Water Cube) for Beijing Olympics 2008 - Arup," n.d.)

The Council House 2 shown in Figure 6 is a 10-story sustainable building designed by Mick Pearce in Melbourne, Australia. The design of the building is a sustainable biomimic design that is influenced by a tree bark and saves energy. The facades of the building are inspired by the wood's epidermis texture. Opening and closing panels forming the facade shell work as wind pipes and act as air filters for interior spaces. It has been observed that this design saves 65% in natural lighting and ventilation (Toth et al., 2009).

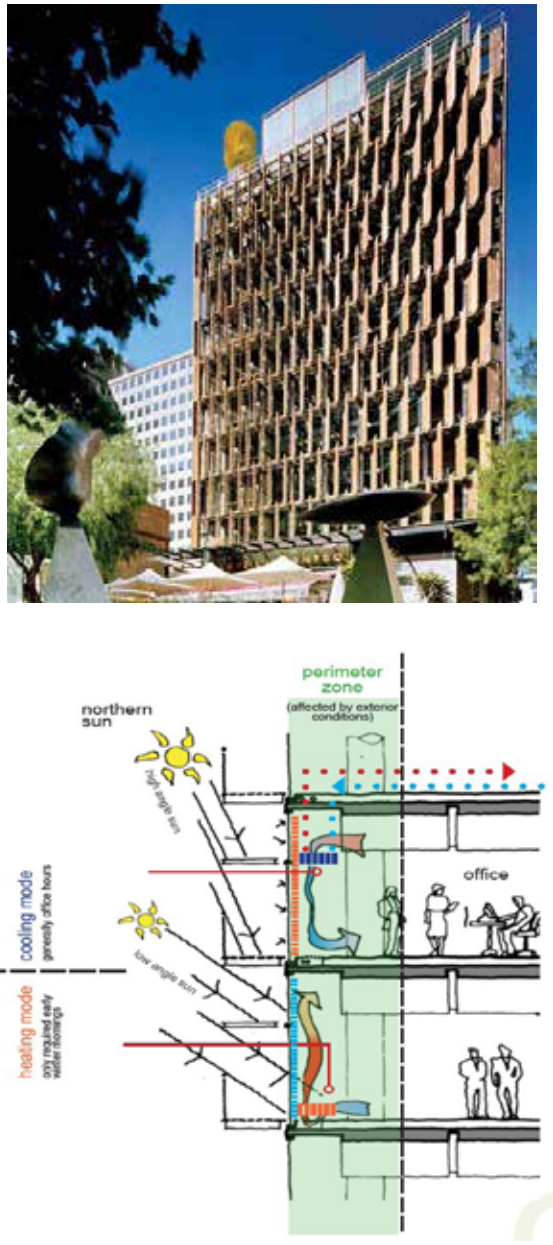

Figure 6: The Council House 2 Melbourne, Australia (front view and passive ventilation mechanism)(Toth et al., 2009)

Biomimicry designs can sometimes accommodate many mechanisms. The best example of this is tensegrity systems. This system was inspired by examining the tensile forces between a rabbit's bones, muscles, and ten-

dons (Fig. 7). In addition, the fiber molecules of spider webs were originally intended to stabilize a structure by stretching force (Kim & Park, 2018).

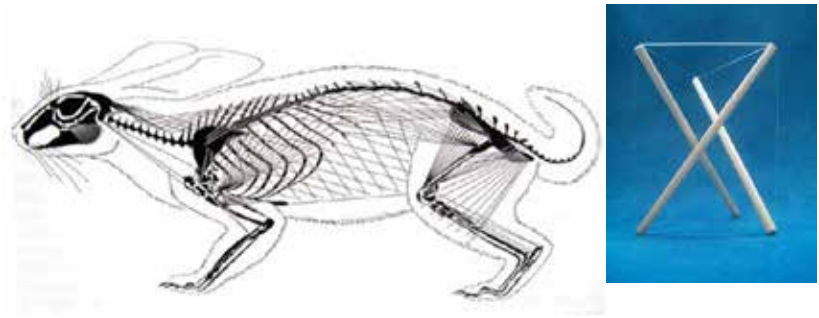

Figure 7: a) Biotensegrity Diagram of Rabbit's Musculoskeletal System b)Tensegrity Module (Kim & Park, 2018)

Tensegrity system is geometrically and mechanically complex. While the stabilization of a standard building is provided by gravity and the weight of the structure, tensegrity systems are stabilized by three-angle tension and compression forces (Kim & Park, 2018). Thus, the structure remains stable even without gravity.

Tensegrity structures are extremely light and strong structures. Thanks to these features, they have been a source of inspiration for bridge designs. The first tensegrity bridge design is the Kurilpa Bridge for pedestrians ("Tensegrity-inspired Design for Kurilpa Bridge - Arup," n.d.), which was built in Brisbane Australia between 2007 and 2009, in partnership with Cox Rayner, Baulderstone and Arup, shown in Figure 8.

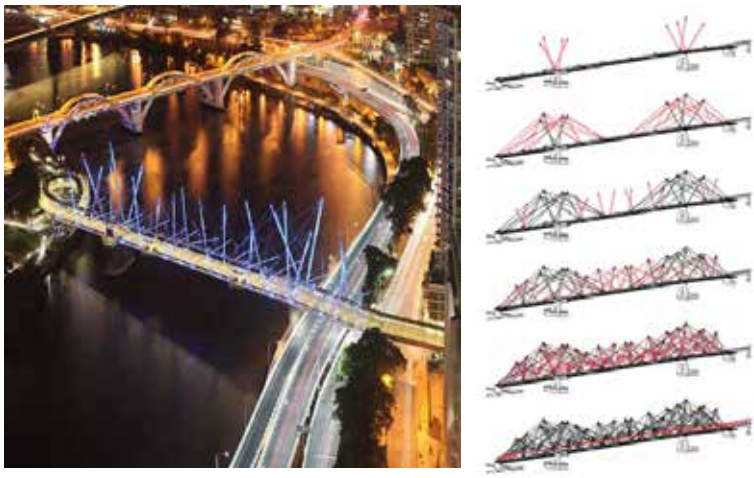

Figure 8: Kurilpa Bridge (left), Tensegrity structure construction stages diagram (right), Brisbane, Australia ("Tensegrity-inspired Design for Kurilpa Bridge - Arup," n.d.)

3.2. Aquatic Plants in Biomimicry Studies: Lotus Effect

Water lily (Nelumbo nucifera), one of the aquatic plants, has inspired many designers in their biomimicry works. The lotus flower is a sacred flower that symbolizes the clarity of the mind and the purity of the soul in Buddhism and Hinduism. Lotus Conference Center built in Wujin, China (Fig. 9) designed by Studio505 appears as a biomimic structure that sculpts the form and spirituality of the flower and contains strong symbolism (Kim & Park, 2018). Lotus Conference Center symbolizes productivity and transparency by associating it with a feminine biological form. Color and light come together and illuminate, creating a bright and invigorating interior atmosphere, whatever the weather. In the project, the heating and cooling system of the building is provided by heat pumps and thermal chimneys installed in the lake.

Figure 9:Lotus Conference Center Wujin, China (Kim & Park, 2018)

Leaves of lotus plants have hydrophobic biomechanisms. Therefore, lotus flowers and leaves have an important in biomimicry studies by reason of hydrophobic structure that does not hold water. Micro structures on the surface of the leaves cause hydrophobicity, which consists of polymers between 16 and 36 carbons, such as high-carbon paraffens, and alpha-matic compounds (Nosonovsky & Bormashenko, 2009). The structure that provides hydrophobia in leaves is called cuticle and has a waxy structure and covers the whole leaf. Thanks to this hydrophobicity, water drops cannot adhere to the leaf surface, and also provides the self-cleaning feature of the

leaves. Papillae, which provide micro-scale surface roughness formed by epidermal cells on the surface of the leaves, increase the contact angle of the water to the surface. While the water contact angle on a wax surface is 95 ° -110 °, the static water contact angle in the lotus leaf was observed as approximately 160 ° (Nosonovsky & Bormashenko, 2009). As shown in Figure 10, when the leaves with water-repellent properties are examined under the electron microscope, the papillae range from 5 μm to 100 μm in size and have a convex geometry. In the lotus plant, there is a density in the range of 5-10 μm (Zorba et al., 2008).

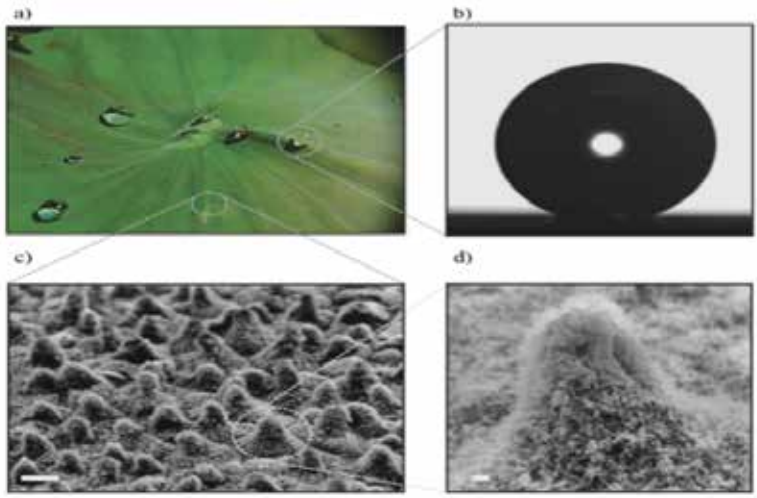

Figure 10: a) a) Picture of water droplets on a Nelumbo nucifera (Lotus) leaf. b) Static contact angle measurement of a water droplet of 0.78 mm radius on the Lotus leaf surface; the contact angle is 153°+1°. c) SEM image of the leaf surface comprising almost-hemispherically-topped papillae with sizes 5–10 mm with surface density of $4.2*10^5$ cm^{-2} (scale bar 10 mm). d) High magnification SEM image of a single papillose depicting branch like protrusions with sizes of about 150 nm (scale bar 1 mm) (Zorba et al., 2008).

This hydrophobic property in the lotus leaf is formulated with thermodynamic rules with the Young, Wenzel and Cassie equations, and a bio-nanotechnological silicone resin-based exterior paint was produced by relating a rough solid surface to the contact angle, free gibbs energy and suface tension (Nosonovsky & Bormashenko, 2009; Zorba et al., 2008). In 1998, Barthlott started to be used as a biomimic nanotechnology product as “superhydrophobic, micro / nano-structured self-cleaning surface material” by obtaining a commercial patent in Europe under the name of “Lotus Effect”, shown in Figure 11 (Orhon, 2014).

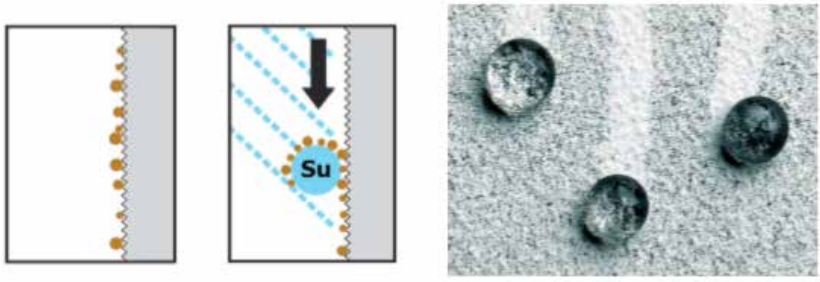

Figure 11: 'Self cleaning' mechanism for Lotus effect facade paints and plaster (Orhon, 2014).

Hydrophobic exterior paint is used in 500,000 buildings worldwide that is estimated. The most well-known examples are the Ara Pacis Museum in Rome, which was designed by architect Richard Meier, who often uses white color in his projects, shown in Figure 12. Since the air of the city of Rome is very dirty, this facade material has been chosen considering the white color not losing its architectural effect over time and taking into account the maintenance cost. White color was used as a concept in the design to protect the Ara Pacis Augustae altar and to display it without competing with historical artifacts by providing effective light reception (Orhon, 2014).

Şekil 12: Ara Pacis Museum (Rome, Italy, 2006, Richard Meier)

Another example, inspired by the lotus, is the Lilypad project, which has not yet been implemented (Figure 13). Designed by Vincent Callebaut as an ecological floating city, the utopian project, which has the capacity to accommodate 50,000 people, is expected to be a promising solution for cities that are predicted to be inundated due to climate change. Urban design aims to create a large-scale ecosystem, using solar, wind and ocean energy, creating a green tissue with energy and fertilizer by recycling biological waste, for increasing biodiversity and reducing the rate of carbon dioxide in the air (Uçar, 2019).

Figure 13:Lilypad Eco-Floating City, Vincent Callebaut ("Lilypads | Vincent Callebaut - Arch2O.com," n.d.)

4. DISCUSSION

The importance of aquatic plants in biomimicry studies appears as a factor in the development of technologies that will strengthen the relationship of urban fabric and structures with water, and the biological mechanisms of nature to save energy for architects and planners. If it is aimed to reduce carbon and water emissions, this can only be achieved by adapting to nature.

150 billion dollars are spent for cleaning building facades worldwide that is estimated (Orhon, 2014). In addition, deaths and injuries occur during facade cleaning. Self-cleaning facade materials, developed to reduce both labor force and the amount of water and cleaning materials used for cleaning building facades, are sold commercially as patented products (StoLotusan, n.d.). The lotus effect exterior paint, which is a biomimic technology, has started to be applied on glass curtain walls, considering the facade cleaning of skyscrapers (Nosonovsky & Bormashenko, 2009). In addition, the patent of this bio-nanotechnology has been shared for use in roofing materials, automotive industry, optical lenses.

Inspired by the lotus appeared in the form of discarded ideas floating city, projected to be the cause of global climate change and sea level rise city that hosts threatened with inundation, it is believed to be the path of sustainable alternative solution. This idea offers the possibility of avoiding loss of life and property for ocean islands and coastal cities affected by seasonal rain and storms today, as well as expansion for developing island countries such as Malta.

According to the climate temperature data and changes in greenhouse gas emissions since the beginning of the 19th century, the sea level rise is accelerating. Sea level is expected to rise between 20 and 90 cm in the 21st century (Slangen, Katsman, van de Wal, Vermeersen, & Riva, 2012).

An increase of 1 ° C in climatic temperatures will cause the sea level to rise by about 1 meter. This would ingest a significant portion of the densely populated city lands such as Netherlands, New York, Shanghai, Hong Kong, Miami, London, Vietnam, Egypt, Bangladesh and many more. In such a situation, 250 million people's home will be flooded and these people will have to become climate refugees ("Lilypads | Vincent Callebaut - Arch2O.com," n.d.).

5. RESULTS & RECOMMENDATION

As a result, we are faced with serious problems such as environmental pollution and global warming due to unplanned urbanization and unplanned energy consumption, which have accelerated in the last century. Green areas in settlements are decreasing and concreting is increasing day by day. However, the demand for food is increasing in parallel with the population growth. However, with the effect of global warming, many agricultural areas are becoming deserts and consequently the number of people who cannot reach safe food is increasing. Another important point is that the increase in environmental pollution in cities negatively affects both physiological and psychological health of individuals in the society. Therefore, the existence of every future species is endangered.

In order to prevent the global environmental crisis, every segment of the society should work in a sensitive way to nature. Scientists, administrators, governments, businessmen and every citizen must act in cooperation. Priority should be given to the fact that the technologies developed are nature-based solutions and it should be aimed to be accessible to every person. However, ecological and sustainable development should be aimed for healthy cities and a healthy society. Of course, it is not too late to deal with this situation. In this regard, international sanctions and various agreements aiming at sustainable development, especially the European Union, are regulated; Like the UN Framework Convention on Climate Change, the Paris Agreement on Climate Change. Many countries aim to reduce the use of fossil fuels by changing their energy policy, and they aim to "provide access to affordable, reliable, sustainable and modern energy for everyone", especially as it was mentioned in the Habitat III 2030 Agenda (Akkurt, Turhan, & Velibeyoglu, 2019).

Along with sustainable development, urban designs and society's lifestyle must evolve based on nature-based solutions. Steps should be taken for more efficient and green cities by progressing within the framework of the "ecological-smart city" concept, integrated with the developing technology. In the light of this definition, the Hammarby Sjöstad region in Stockholm, Sweden, where the possibilities provided by the technology and ecological city design come together can be cited as an 'eco-smart

city' (Velibeyoglu, 2016). It has been selected as "Ecological Capital of the Year 2010" by the European Union Commission. If we need to explain this success in a small summary, it has been renewed with environmentally friendly urban transformation projects with high energy and resource use efficiency and technological infrastructure. Public transportation and non-motorized transportation types have been expanded (Arslan, 2014). Providing computer and software-supported waste and water management, regional central heating and cooling systems have been used in buildings with clean waste incineration technology and heat pumps installed in lakes and seas. In urban design, by establishing a balance of green space and structure distribution, the proximity of each individual in the society to the green texture is prioritized. As a result, since 1990, the emission of carbon dioxide from district heating has decreased by 60%, the use of crude oil has decreased from 80% to 3%, and 75% of the waste has been disposed either by recycling or using it as fuel (Diler, 2012). The city's potential to contribute to global warming has been reduced by 29% (Arslan, 2014).

As the successful results of ecological and sustainable approaches that provide energy and resource efficiency in urban and built environment design as in the Hammarby Region are realized; many scientists and designers turn to nature-based solutions. For this reason, biomimicry is emerging as a great resource in the field of design and innovation for the creation of sustainable projects. However, biomimicry should not be seen as a style in itself, but as a tool for design development. Biomimicry is more than just copying or reproducing an organism or system, it is a careful study of the organism or ecosystem to obtain the fundamental design principles that are intentionally applied later on. In biomimicry, biology is the main tool that should be used to reach a design to solve problems. The question behind every biomimetric design is "how would nature do?" must be (Al-Obaidi et al., 2017). Thus, urban and building designs that can adapt to climate change, protect biological diversity and support production can be paved.

In this study, it has been tried to draw attention to the technologies and designs in which the compelling and disadvantageous effects of the water element in engineering and architecture can turn into an advantage through biomimicry. In this field, the lotus flower's physiology and relationship with its habitat inspire architects and urban planners. The studies conducted have guided innovative technologies and sustainable designs, contributed to the developments and projects that provide energy savings and aim to become a part of the ecosystem.

Studies are not limited to water lilies, but also other aquatic plants should be included in these studies. In addition to the flood and overflow problems caused by the seasonal rains and storms that are currently

occurring, the sea level rise with the effect of global warming, which is a problem that has not yet fully manifested itself, does not completely destroy the habitats of many living creatures, without completely destroying the adaptation processes of aquatic plants and their lives in the aquatic environment. It is hoped that future disasters will be prevented by applying the mechanisms they use to continue to be applied to future technologies and structures through biomimicry. The mechanisms within nature itself will guide scientists in the use of water as clean energy and resource by eliminating compelling and preventive situations in engineering.

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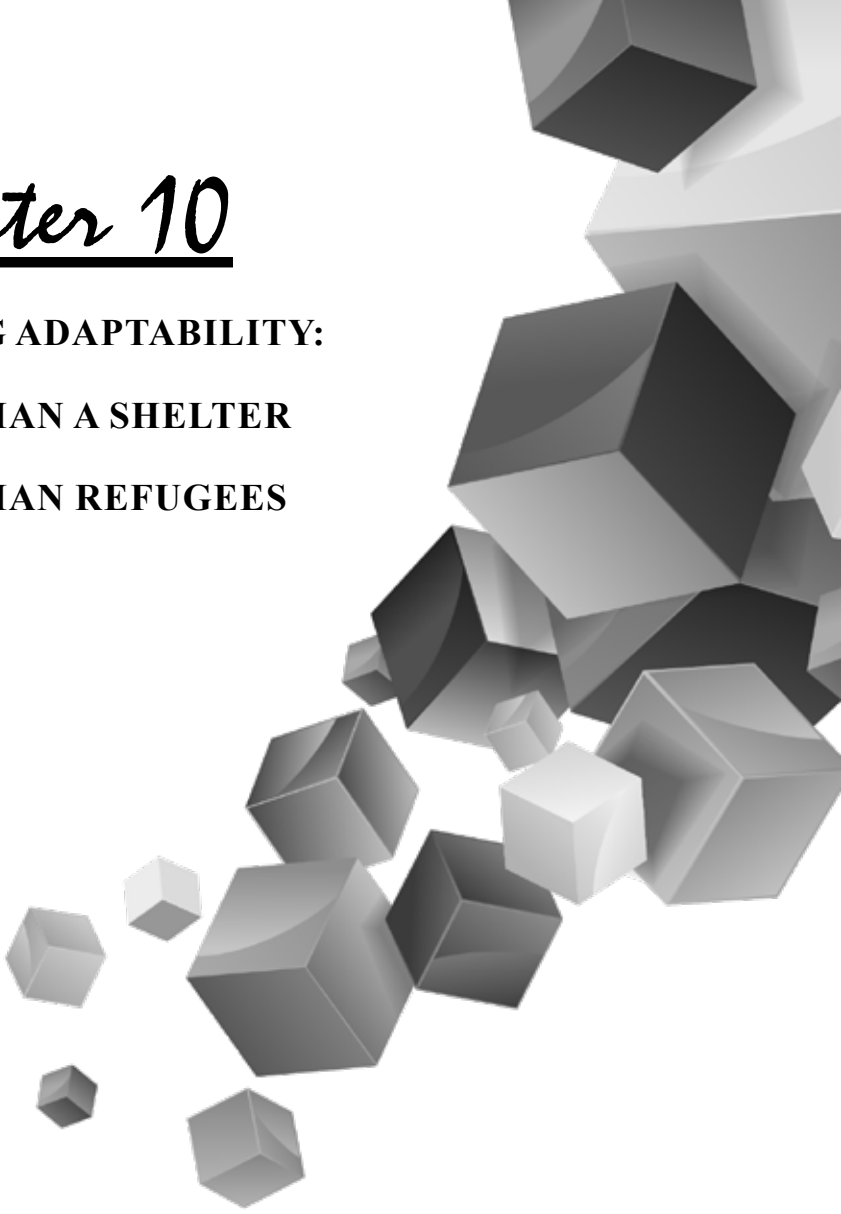
Chapter 10

HOUSING ADAPTABILITY: MORE THAN A SHELTER FOR SYRIAN REFUGEES



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1. Introduction

Discussing the notion of migrants' integration in the destination society, we rarely touch the housing and accommodation role in the integration process since there is a strong relation between the housing morphology and attitudes/activity patterns of the people, In the situation of the migration, people bring with them their activity patterns, which are influenced from the typology of their previous life, and try to create an adaptation with the new typology of the new hosting country.

This is more evident to the observer's eye in the case of refugees, since generally it brings to mind forced migrants living in camps or looking for a shelter whatsoever! Moreover, in the refugees' case, the receiving government designates certain neighborhoods to the refugees to live in, in order to be under strict control, as many cases in Lebanon, Jordan and Egypt.

The case of Syrian refugees in Turkey was a mix of the previous three different scenarios, but with the prolongation of the war years, and the absence of prospects for political solutions that allow the return of refugees, we started to witness a migration of Syrians to Turkey for other reasons than escaping the conflict. In addition to that, the inter-cities immigration of Syrians started to appear in Turkey looking for better conditions and opportunities of study, work and living in general. These different forms of mobility made what we can call urban refugees as the predominant situation in Turkey.

Turkey had granted temporary protection status to more than 3.1 million Syrians as of July 2017, while in total accommodating around 5 million Syrians. Fewer than 2 percent are still living in camps, while the rest are scattered across the country, mostly in urban centers, living side-by-side with the local population. The map shows the situation on November 2018. The emergence of these urban refugees has important implications for local governments, especially municipalities. These newcomers arrive with a cultural and economic background, with a variety of different needs, ranging from housing and education to language support. Their big numbers in some cities have caused tensions with the local populace, and made their integration in hosting society somehow a challenge for both sides. This again created the urge for moving to other cities looking for better chances and less tense atmosphere.

Even as municipal governments tried to meet many service needs, the major focus was on the basic needs and the legal situation of these refugees, the importance of housing remained on the point of providing a shelter, more than meeting the real needs of the families of the size and design of housing units. Therefore, the *urban refugees* took the initiative to look for suitable housing, modify it, if possible to meet their aspirations,

or to force themselves to adapt to the new cultural, economic and social conditions they are living in.

This chapter is adapted from research led by the Master of Post war/disaster rehabilitation, reconstruction and development in Ankara Yildirim Beyazit University, and conducted by students under the direction of the authors from February to July 2019. The study aimed at understanding how the Syrian refugees and migrants in Ankara, the capital city of Turkey, managed the process of settling in their districts, adapting to the different forms and styles of housing and accommodation stemming from the Turkish culture and society. Furthermore, the study aimed to define the differences in social behavior in housing neighborhoods between Syrians and Turks, since although it seems that they have similar cultural background, deeply we could find major differences reflected in the use and modifications of housing units to suit their diverse urban behavior.

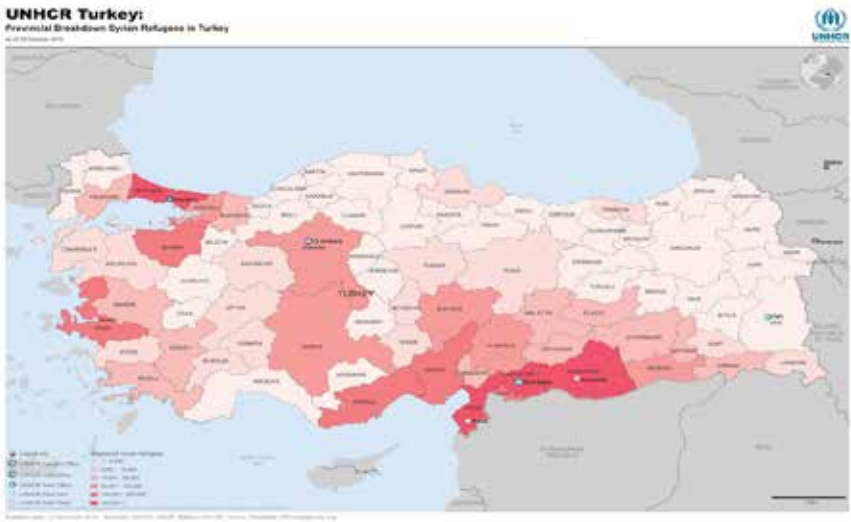

***Fig. 1**: Distribution of Syrian Refugees in Turkey 2018*

2. Statistical analysis and background

Maybe, one of the major problems when studying immigrants and refugees' integrations in hosting countries, is considering them as numbers, generalizing the situation according to statistical analysis instead of dealing with each case separately as a human being having needs, dreams and challenges. Some could debate that this applicable only when we have a limited case of migrations, but when we have a huge problem as the massive flee of Syrians to Turkey it will be almost impossible to deal with the individual cases.

According to UNHCR, Turkey is home to the world's largest refugee population, with over 3.6 million Syrian refugees and close to 400,000 refugees and asylum seekers of other nationalities. While non refugees Syrians also reach more than 1 million residents in Turkey, making the total number of Syrians nearly 5 million, this is a higher population than many Arab countries such as Lebanon, Kuwait, Bahrain etc. Over 98 per cent of refugees in Turkey live in urban, peri-urban and rural areas, while the remaining refugees (1.7%) live in Temporary Accommodation Centers [3](UNHCR Turkey, 2019) According to the Goc idaresi (Turkish immigration administration) the majority of Syrians are living in Istanbul, Gaziantep, Sanliurfa and Ankara. Moreover, around 300 thousand children were born in Turkey, and 700 thousand are in schools(TUNÇAK, 2018).

The aforementioned numbers, shows the huge needs and challenges facing the hosting communities, and describes even a little the reasons behind the problems started to appear recently, and the tension between Syrian community and Turkish hosting community increased with the economic, political and managerial difficulties Turkey has faced during the years of Syrian war. Higher attention was given to fulfilling and supplying the basic needs as health and education services, while the accommodation and housing was provided only to 1.7% of the refugees, the majority managed to rent houses, covering the expenditures either by their savings, or by receiving minimum support from NGOs, and humanitarian organizations in Turkey. The lack of attention to this issue resulted in different faces of the problem:(Taştan, Ayşe and Kavuncu, 2017)

- Stacked refugees in the border cities.
- Isolation of Refugees communities in the hosting cities
- Creating Ghettos of immigrants, characterized with poverty and lack of services, a fertile land for extremism and social conflict.
- No stability leading to second or third immigration, to a third country.

3. Immigrants' adaptation for housing

Due to the differences in lifestyles caused by slight differences in cultures, backgrounds and environmental characteristics such as climate, people of both countries have their own housing conditions. Chen and Thwaites define the "type" as the frame of a set of characteristic features of architecture and urban spaces at a certain scale.(Chen and Thwaites, 2013). Typological process, as a key term in architecture and urban design, which provides a benefit to cultural, responsive and qualitative place

3 https://reliefweb.int/report/turkey/unhcr-turkey-fact-sheet-october-2019

making is an important characteristic for socio-cultural sustainability of architecture and urban planning. (Gokce and Chen, 2019) This process is an organic process, and the constraints of this process are culture, lifestyle, materials, and technology. The typological process is a tool which intends to reveal why and how the built environment changes.(Kropf, 2006). There is a reciprocal process between these morphologies and the attitudes/ activity patterns of the people living in these environments. In the situation of the migration, people bring with them their activity patterns, which are influenced from the typology of their previous life, and try to make a combination with the new typology of the new hosting country.

Change of housing conditions come into life when social shifts bring the necessity of a physical reaction to respond to the differences in the relationship between user and building. (Schmidt and Eguchi, 2014). Christopher Alexander emphasizes that there is a strong relationship between human functioning and its spatial concept. The space shapes our behaviors, and we have habits as a result of our experiences. After changing the territory, we intend to sustain our behavioral patterns in the new context. Here we have to mention a balanced adaptation process both in sense of spatial and human activity patterns. We focus on housing design flexibility/adaptability, which provides users with the opportunity of meeting this requirement if the location is stable, but the time is variable. On the other hand, there are some conditions such as immigration, which is a cross-cultural transition, time is not an important indicator for the adaptation but the differentiation in the location reveals a necessity for an integration, both for the people's activity patterns and the building itself. Housing flexibility or adaptability is defined as to be capable of different social uses' and to be capable of different physical arrangements. (Schneider and Till, 2005) People who migrate have to adapt themselves and their houses spontaneously and mandatorily. On the urban scale, the space also plays an important role for a better adaptation by providing communication possibilities.

Turkey as a country welcomed many refugees, experienced this transition in several parts of the country. Most of the immigrants have had difficulties confronting a different culture and environment although the culture of both countries are similar. Generally, they tried to find housing conditions, which are similar to their previous circumstances. They have created their own neighborhoods. An analysis and a survey has been conducted in Ulubey neighborhood, which is an example of this community of immigrants, in order to understand the dimensions of this adaptation. The participants were asked questions related to their permanent hous ing conditions/habits in previous houses in their home country, and their current housing conditions. General findings regarding the differences of residential conditions and their adaptability are presented. Figure 2 shows the studied area.

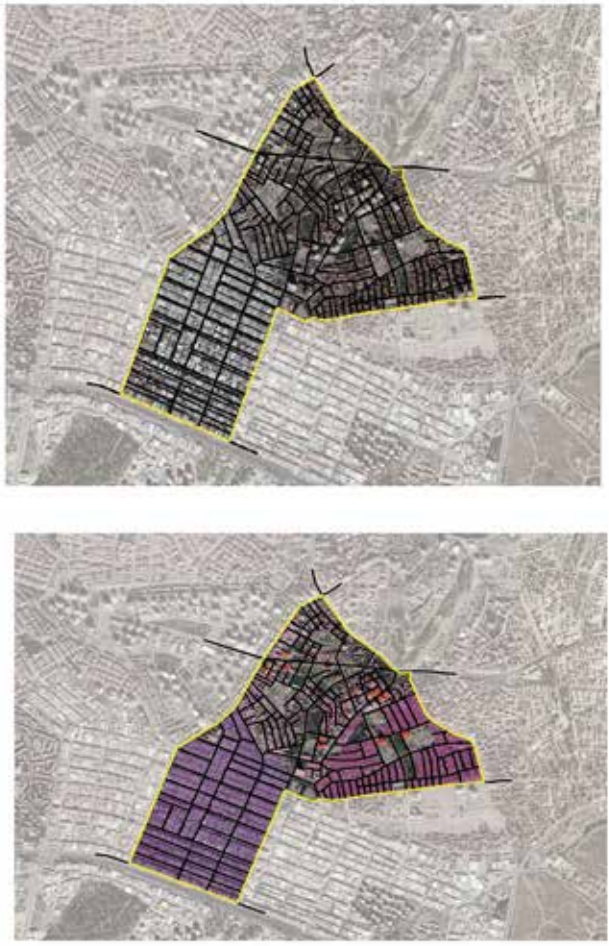

Fig. 2: Ulubey Neighborhood, accessibility (Up) and land use (Down)

4. Similarities and differences of housing types and accommodation facilities

The Survey was designed to understand and define the similarities and differences between different accommodation facilities. The difference in use, any modification needed or performed to enhance better adaptability according to cultural behavior also was surveyed. Table 1 shows the questionnaire, which is divided into 15 categories, from the use of public urban spaces such as parks, gardens, playgrounds, to the use of housing units and its spaces such as kitchen guest rooms, and bedrooms.

Table 1: Questionnaire for understanding adaptability of refugees in housing and accommodation facilities.

Describe your home in Syria and now, (type of the house, number, usage and size of rooms, mat. ,) Are you living alone or with relative? Where do you spend most of your time in house (for you and every family member)?
How many meters square is your house? How many people living in? How many children living in? Do children have separate rooms? (from adults, as gender) Do you need extra spaces, what do you want to do with if there?
Have you made any change in your house since you moved to?
Neighbors, Percentage of Syrian in your neighboring? Do you have Turks living in your neighboring area, do they/living in Turkey affected your daily life (sleeping hours, common responsibilities -cleaning stairs-)
Do you notice changes in your habits between your home town and here in case of - Usage and numbers of Balcony - Privacy (abagor vs perde and others) - Size and usage of the Kitchen - Inhouse Storage - Common/shared spaces in the building (usage of garden, usage of roof) - Attending public activities (cultural, festival, etc) - Using public transportation - Meeting people (frequently, hour and place of meeting) - Hosting a guest in your house
Do you feel comfortable at home?
Things you want to change but you cannot? Alternatively, things missing?
Do you have any relatives here, where do you meet them? Frequency?
Would you like to change anything in the architectural space of the neighborhood?
Do you feel the lack of any places in the neighborhood/city comparison to the neighborhood where you lived in your country/Syria?
Which (spatial) conditions / places do you find better/worse than the neighborhood where you lived in your country/Syria?

Where do your children play? Do you usually allow them to play outside the house? What do your children play? With whom do your children play? do they playing with Turkish children? In Syria where they play, what, and with whom?
Are there any safe areas close to your home for children to play? How many? Describe them Describe other possible places than playgrounds for playing?
What are playground equipment? Are they customized to play or are they reused to fit games?
Are the places that children play in and playground equipment enough/adequate for the .children?
Are there any green areas for walking, running, cycling and have barbecue near, how often do you use them? Do you find this greenery enough How were these conditions in Syria/your country?
How many meters square is your house? How many people living in? How many children living in? Do children have separate rooms? (from adults, as gender) Do you need extra spaces? What do you want to do with if there?

The interviews included a big variety of Syrians accommodated in the area, males and females, singles, married, widows …etc. Most importantly, that even they are coming from different cities or regions in Syria there was a common culture and behavior using the urban and architectural spaces in the neighborhood. Moreover, the majority are coming from Aleppo region, which enforced or idea of creating ghettos for the community, which is reflected in the treatment of Turkish authorities and society with the area. The media even started to call the zone as (Small Aleppo) in different reports about the area.[4] The results and findings in different categories are discussed in the following chapter.

4.1 Neighborhood: relation and communication

Ulubey neighborhood is an urban transformation area and this provided more flexibility for the immigrants to implement their desired adjustments, especially on urban scale. When the government started to perform and execute the new upgrading plans, the differences and interventions in the urban spaces became unimportant, particularly it upgraded the area to be similar to the modern zones in the city with high-rise buildings rather than detached or semidetached, village type houses. This urban transfor-

4 https://www.hurriyet.com.tr/yerel-haberler/ankara/altindagin-kucuk-halepi-41099182

mation area has provided an opportunity, at the beginning, considering that they have also been in a transformation process between their preceding and succeeding living forms, activity patterns and daily rituals.

Syrian people are used to host large numbers of visitors and guests. They indicated that this routine has changed distractedly because of the limited size of the dwellings and small dimensions of the rooms. Moreover, they hesitate making big gathering to avoid making noise together, as an alternative, they use public parks and other open spaces for gathering. Figure 3 shows some photos of Syrians hosting their guests or meeting their visitors in public spaces. Moreover, the public park in the area officially named (Ulubey park) became to be known as (Syrian Park) because of its extensive use by Syrians for these objectives.

Figure 3: Using public spaces to have guests and visitors

Nevertheless, the Syrians in this neighborhood are in close contact to each other, and indicated that they avoid making relations with Turkish residents for many reasons. Moreover, they take precautions not to annoy their neighbors in actions as decreasing the volume of their voices and TV sound. They also stated that there are some cases that they feel insecure, because they feel themselves being observed. However, some positive relations regarding communication with Turkish citizens, were also mentioned during the research such as meeting in open spaces or providing solidarity.

4.2 Form of Ownership:

People in Syria usually prefer to own their houses; therefore, they have the freedom to change their house according to their requirements. Because of the law in Turkey, which prohibits the Syrian from owning real estate properties, the Syrian immigrants cannot own houses. Although many Syrians has started their own work activities, and gain enough money to buy houses, lands or jobs, they cannot do that due to the law. The law does not differ refugees from immigrants in Syrian case, while other nationalities have this right, and Iraqis for example were the main nationality

to buy and own real estate properties in Turkey in 2019.[5] This situation forced Syrians to adapt to available housing conditions; allow them just to make simple changes since the majority of the houses are rented, and in some rare cases the accommodation are provided by government or humanitarian NGOs.

4.3 Inviolability of public areas:

During planning and designing phases of public spaces, there is high interest in controlling the dimensions of urban spaces; and protecting the inviolability of the streets. While the main difference appears in the phase of using these spaces, while in Turkey this is respected, and the law also apply penalties to those who violates them by occupying for commercial or private use. While in Syrians culture, violating public spaces is a common practice, this could be related to long experience with corrupted municipalities, no trust at all of administrative authorities , and the absence of law enforcement justly on all residents. Some cases, residents annexed part of the street to their own houses in a permanent structure; this gave the idea for the early immigrants that it is possible to occupy the streets similarly in Turkey.

Figure 4: A new building on the street, Aleppo 2010(left), Using street as a market-Ankara 2019 (Right).

4.4 Spaciousness of the dwelling:

Most of the immigrants have the priority in their home country to find a large dwelling with improved light and ventilation. In addition to that, due to the architectural norms the area of their previous houses were between 140-170 m^2, while as forced immigrants, they needed to adapt to the sizes of houses they live in Turkey, which have not exceeded 65-100 m^2. Interestingly, the interviewees told that their feeling of house spaciousness was similar to their homes back in Syria. Mainly because the density decreased in the dwellings, and the transitional period they spent in camps of tents or containers.

5 https://www.damas.net/blog/ten-foreign-countries-bought-real-estate-most-turkey

4.5 Family relations:

Despite the narrow spaces, the users expressed that this increased the warmth in family the relations. Mainly, they thought that it is a temporary situation, and people believed that they should stand together to pass this tough times, depending on "Economy of Scarcity" they have created new social relations and forms supporting the survival period. Unfortunately, this Temporary period, changed to become to more permanent, thus the people started to look for enhancement in their living conditions.

4.6 Difference in room functions, guest room case:

The Syrian people, with a strongly rooted culture of hospitability, like to have a separate and independent guest room, which include its own bathroom in order to host the guests for extended period. This guest room has a direct relation with the entrance of the house to ensure the independence of the guest, and give him the freedom to move. Simultaneously, this room is connected to the other houserooms as kitchen and dining room in order to provide other services, but protecting the privacy of hosting family.

In Turkey, the typical house plan has a room for guests, which is called "salon". This room has no bathroom as in the guest rooms in Syria. Generally, these rooms are the biggest rooms and have the best position regarding sun light, ventilation and view. This "salon" function misunderstood by Syrians. Since in Syrian houses the "salon" is an affiliated small space that is used as an extended entrance to other rooms. For most of Syrians, the salon is not to live in, it is a circulation space between different spaces of the house, and it is almost an extended corridor. While on the other hand, living room has a separate space connected directly to the balcony, in order to provide the necessary lighting without the use of electrical instruments, and to have a good view on the external urban spaces. In Figure 5 and Figure 6, the difference of Salon and Guest room in Syrian houses is clarified.

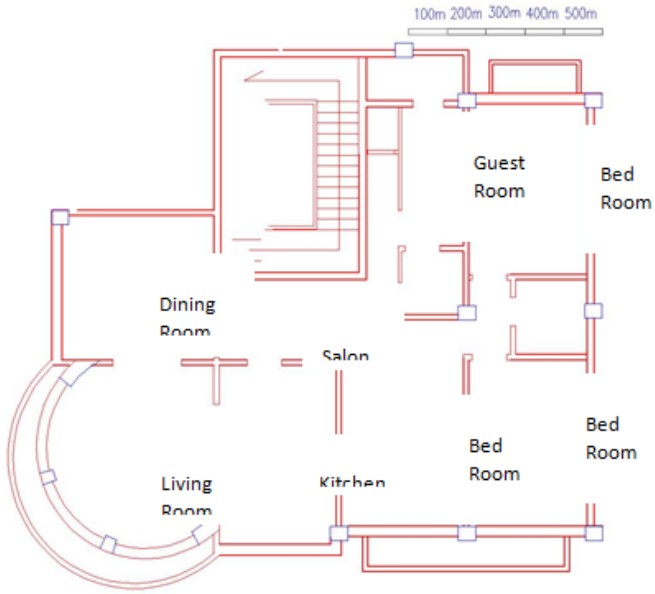

Figure 5: a plan of Typical Dwelling in Syria

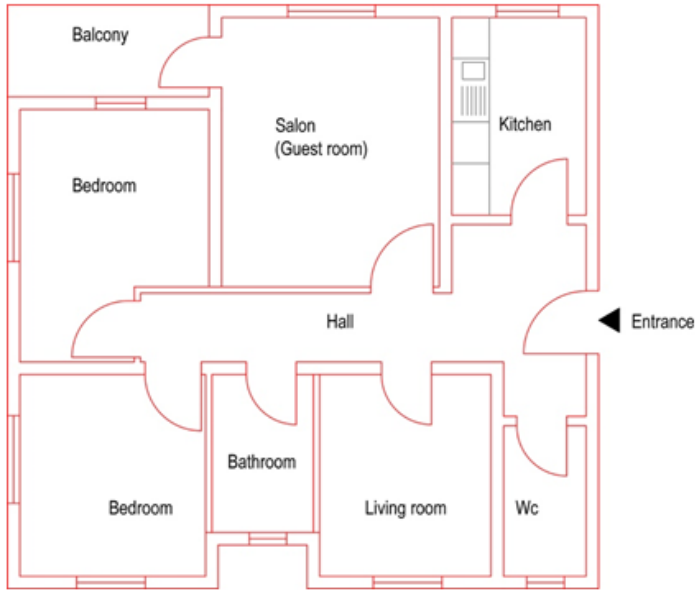

Figure 6: a representative plan of Typical Dwelling in Ulubey neighbourhood/ Turkey

4.7 Changed /effected activity patterns and habits:

In general, the change of activity patterns is strongly related with the previous lifestyle of the people. Those who come from city centers indicated that there has not been a crucial change in their activity patterns. However, they have felt themselves more civically integrated than their neighbors who has a lower-income and coming from rural areas. Those coming from countryside, towns and rural areas have confronted the difficulties of the new urban lifestyle, in addition to the challenge of being a forced immigrant in a new country. This double effect enforced them to change their daily habits, starting from their external appearance to the activity patterns. This situation shows that they have adapted themselves, obligatorily, to the new conditions of the new culture. For example instead of playing in open fields or streets, children were encouraged to play in the common spaces of residential areas in order to learn Turkish and do activities with Turkish kids, this fostered their adaptation in the new community.

Figure 7: Children activities playing in streets(right) to common spaces(left)

4.8 Balconies:

One of the clear differences culturally in housing use adaptation is the use of balconies. The immigrants felt the balcony as public or semi- public space, rather than a private or semi- private space as the case was in Syria. Previously, since they knew each other in the neighborhoods, and were relative mostly, they acted more comfortably while using the balcony, on contrary, most of the expressed that they felt exposure, and needed to take care of their acts, when being on balcony.

In one of the interviews, they explained that they felt forced to wear specific clothes and act more strictly, since they felt being in the street, more than being at home.

4.9 Usage of houses yards:

Completely opposite to the case of balconies, the front or back yards of the houses are considered a private property owned by the ground floor

owners in Syria. In Turkey, it is a common space for the building, in the early days of the Syrians in the neighborhood they used to plant some vegetables, flowers …etc, and many conflicts occurred because other owners tried to use this space. When Syrians understood the situation, they started to use it as a common space, which is, unfortunately, not well respected as we mentioned previously.

4.10 Kitchen:

The immigrants coming from Syria used to have large spaces for the kitchen, thus it was an important issue to consider when deciding to rent dwelling in Turkey. The houses in Ulubey, most of which were built before 2000s, did not have thıs feature. They have had to apply some changes in order to create more space in the kitchen because they considered them small compared to their lifestyle. Moving of fridge, washing machine, dishwasher to another room from the kitchen can be given as an instance for these changes. In Syria, if the case was similar, they would have added the balcony to the kitchen or even moved a partition wall to decrease a room and increase the kitchen size. This was a common practice with the houses constructed in the socialism era in Syria. They also prefer to have storage spaces for the kitchenware, which is not provided in the case for Turkish kitchens.

4.11 Privacy:

The main issue of Privacy when dealing with houses in Syria that the opening is usually to an internal courtyard, in traditional houses, in the modern buildings with exterior opening, the windows occupy less space on the facade. This is due to climate to decrease the heat exchange, but also to prevent outsiders from seeing the inside of the house. Usually, shutters, curtains and special shaded glass added to the windows and external elevations to provide more privacy.

The houses in Turkey, especially those constructed by TOKI, have huge glass facades compared to Syrian case and do not have these shading devices. Although the immigrants believe in the advantages of this transparency and like it, they suffer to achieve balance protecting their privacy. They found their own solutions such as hanging pieces of textile to the balconies or using different materials on the borders of the gardens.


Figure 8: Privacy in Ulubey, immigrants' applications

4.12 Storage:

One important characteristic of houses in Syria that they have a porch, as a level above bathrooms, toilets, and sometimes kitchens, while in Turkey either they use a room for storage or a space in the basement. In addition, due to Syrian norms, water tank and diesel cistern are stored in this porch, or on the final roof of the building, to face long time of water supply interruption, and to store fuel needed for heating in winter using fireplace. In Turkey, they don't need them because either it is central heating with natural gas, or wood burning fire places. This was one of the difficulties they faced to adapt to this heating system many death cases were recorded, for people who suffocated by the smoke of these fireplaces and stoves.

4.13 Building common spaces:

In Syrian houses roofs are not a private property, on contrary they serve as space for community activities and zones for equipment such as satellite receivers, solar panels, reservoirs etc. Even, they meet and communicate in different activities, including birthdays, wedding …etc. Thus, they are designed to be flat roofs, in private houses they use them also for sleeping on hot nights.

This is not available in Turkey, since most of the building have pitched roofs.as a result, the immigrants replaced the building common spaces with the urban public spaces, and started to use gardens, balconies, streets, children playgrounds in order to respond to their communication and interaction demands.

Figure 9: Flat roofs in Syria(Left), Pitched roofs in Ankara(right)

4.14 Applied modification of the space:

According to the aforementioned reasons, the modification were strongly limited. Most of the modifications inside the houses are restricted to tiny adjustments, such as painting the walls and upgrading or maintenance of the installation of water, gas and electricity. More essential and bigger scale modifications cannot be performed since they are not the owners and they believed it is a temporary condition before their return.

Figure 9: Foldable and mobile furniture for multifunctional use of spaces

The second approach was by increasing the degree of multifunctional use of spaces, by choosing flexible furniture and or even removing doors

between rooms to gain more space. Foldable mattresses, carpets and floor sofas also used to save spaces, and change the function of the room from living to bedroom.

Most of the interviewed immigrants indicated that they would prefer to live in larger rooms, and they would combine two rooms, or extend a small room through a corridor if they were able to make changes.

4.15 Playgrounds

Open playgrounds are not very common in Syria, and even if they exisit, they are not supplied with suitable furniture; it will be mostly an open empty space. Where here in Turkey, they municipalities are providing playgrounds completely equipped with games and furniture for children and adults to perform sport and entertainment activities. Unfortunately, the neighborhood lacks such facilities, so the residents, both Turks and Syrians need to go to closest parks, or to use the many spaces in-between buildings in the neighborhood. That allows children to use their imagination, and find their own way to create spaces with unexpected and interesting functions.

Figure 10: Playground occupied by children

5. Discussions

Although upgrading plans are being applied in the area, it seems that it will be themed as the Syrian neighborhood. Even the new buildings which owned by Turks, are preferably rented to Syrians, and move to live in another “more Turkish” neighborhood. We can clearly notice that, even in the transformation of markets and shops from simple and cheap ones to more modern, spacious and even luxury shops run by Syrians.

Investigating the impact of Syrian refugees, on housing in a hosting regions in Turkey. We find that, on aggregate, housing rents have exhibited a statistically significant increase, which is not surprising, with the upgrading of services, and the transformation from refugee status into immigrant, with economic activities. Also, the Turkish owners resided in the

low-quality neighborhoods, moved into high-quality ones and let refugees substituting them.

We argue that negative attitude towards refugees, and differences in habits, tradition and culture are likely the force generating this result. This could result in a social and urban segregation on long term, and we started to notice the formation of Refugees Ghettos, in different cities of Turkey.

6. Conclusion and Recommendation

The long time passed from the first wave of Syrian refugees coming to Turkey escaping the destructive war in their country, and prejudice about similar cultural and social behavior of two communities, have resulted in challenging integration problems.

One of these problems, was the focus on providing a shelter for the refugees, rather than securing suitable and adequate housing solutions for midterm and long term scenarios.

While in other countries, integration courses and workshops are provided to refugees to speed up their adaptation to new conditions in hosting countries, such courses could last for six months, including language, culture, regulations and laws courses to explain the differences and modifications in attitude and behavior of the immigrants to suit the social, economic, and legislative system in Turkey. We can divide the recommendations for housing adaptability on the following levels:

6.1 Social inclusion:

• Government and authorities are required to plan sustainable policies to addressing the long-term needs of housing and accommodation, to meet expectations of the Syrian community.

• Improving social integration, by providing the Syrian community with education and training, as much as possible, which will encourage them to adapt to Turkish living style, and join decision-making processes related with their living conditions.

• Creating more events as opportunities of interaction with the host community, this could be achieved by the establishment of social spaces, which enables two communities to understand each other traditions and cultures.

• The language barrier remains a prevalent factor that impedes social inclusion. The Syrian respondents emphasize the importance of further efforts to offer Turkish language courses, and other interactive earning methods of the language.

• Orienting the media tools to play a constructive role in raising awareness towards Syrians among the local community. Instead of broadcasting negative perceptions or stereotypes against Syrians.

6.2 Policy Recommendations

• The role of local governments and municipalities is essential to facilitate the interaction between the Syrian community and local authorities. Understanding the housing needs, and differences with the Encouragement of Syrians participation in local government platforms, especially those who got the Turkish citizenship, will have a positive effect on the communication between both sides.

• Access to updated information on legal procedures—including residence and work permits as well as those related to legal rights—is an important issue to be explained periodically to the immigrants' community.

Solving the problem of Ownership of real estate properties, will enable the immigrants to design, construct and adjust their houses according to their own needs.

6.3 Integration into the Job Market:

• Management and organizing of Syrian community economy and economic activity will decrease the violation of public spaces with commercial activities, and decrease the tension between the users of public spaces.

Thus, inclusive strategies are needed for two reasons: first, to facilitate Syrians' access to legal employment; and second, to establish support mechanisms, which can address the diverse needs of skilled professionals, and therefore, facilitate their entry into the work force. Such economic initiatives might also contribute to Syrians' social acceptance and inclusion.

• The Syrian community's needs are expected to be considered in the regulation of the work permit scheme. Lifting restrictions on labor market access for skilled professionals could benefit both communities.

6.4 Empowerment of civil society:

• There is a visible need to empower the Syrian civil society groups in Turkey by establishing organizational structures, that try to support the Syrian community present their challenges, express their needs, especially in the non-studied, or tackled issues such as housing adaptability. Joint activities between local civil society organizations and Syrian ones are encouraged to foster a sense of trust and understanding, decreasing the differences and strengthen the integration in their hosting community.

Finally, many other issues which seems secondary, or not essential in the integration process of immigrants in their new receiving community, are aggregating and impede the success of efforts focusing on providing basic needs. Housing adaptation is one of these issues, and we should look to it not as a need to provide a shelter only, but a base stone in the integration and adaptation process of Syrian refugees in Turkish community.

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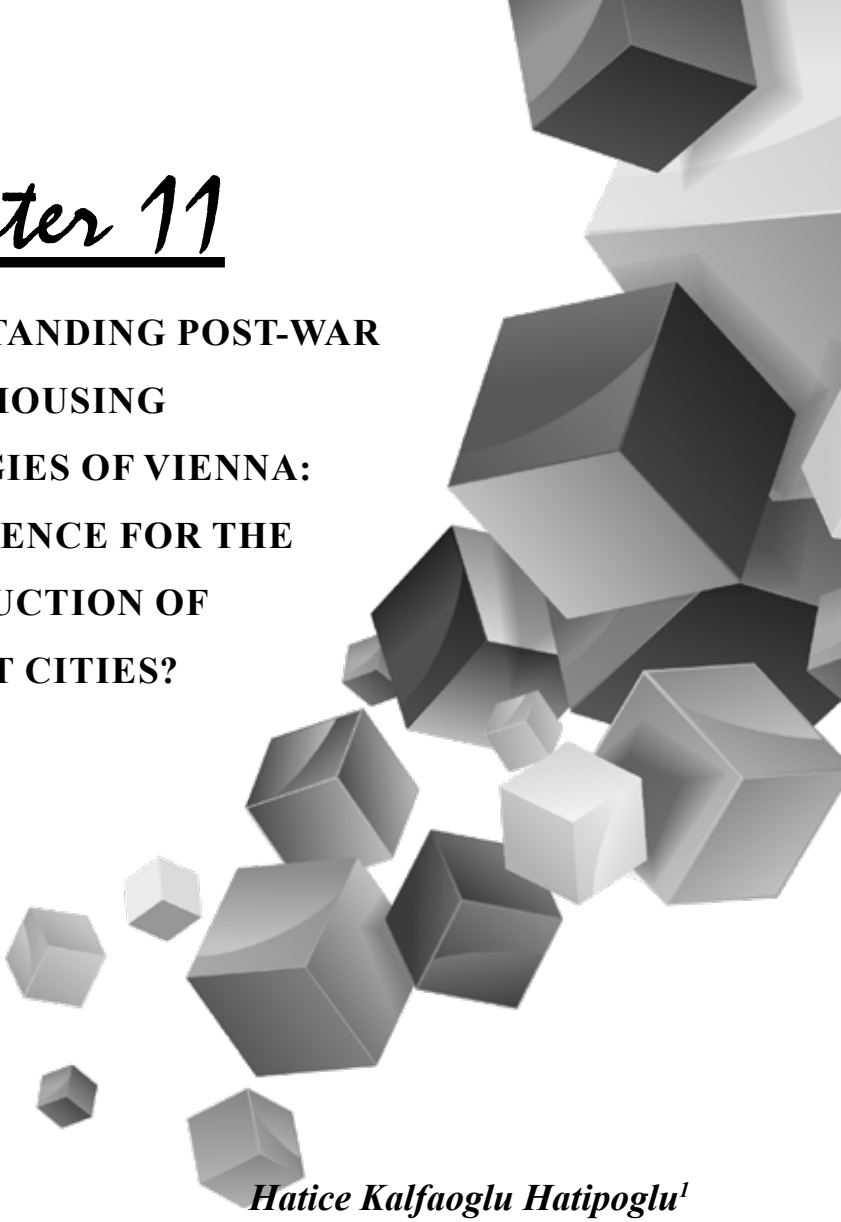
Chapter 11

UNDERSTANDING POST-WAR SOCIAL HOUSING STRATEGIES OF VIENNA: A REFERENCE FOR THE REPRODUCTION OF CURRENT CITIES?



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1 . Introduction

Wars have a negative influence on socio-spatial development of housing as well as cities. The city of Vienna surviving against housing shortage after two wars, has provided a great success in terms of social housing today. It is crucial to trace back housing improvement in the experiences of the previous strategies in which the roots of this success is embedded, in order to provide some guidelines for todays' post-war cities.

The World War I affected the city of Vienna negatively as well as many other European Cities. Housing conditions had already been extremely bad and the housing shortage had become even more acute from before the World War I. Two opposite kinds of housing prevailed in the city. The first is; "Wiener Ringstrasse" which represented feudal upper classes and noble houses of the rich class and the other lifestyle which include workers and employees had to live in dwellings which offered no comfort and no refreshment, taking a subtenant/night lodger (bedgeher/schlafburschen/ Bettmädel) because of the high flat rates. People rented beds instead of flats. Since the war began these conditions even got worse. According to the data in 1919, 2.3% of all flats had an entrance foyer, 14% of all flats had a gas supply and 7 % of all flats had electric lights. Moreover, the infrastructure of the housing had been in a position that provided 5% of houses water pipes. This results in 92% of all flats had a WC outside of these flats. (Weihsmann, 2002)

The results of the World War II in 1945 was different from 1918. The damage was affected the city more strongly. In this era there have been also intense restoration implementations due to the housing construction in the inter-war period

2. Housing After World War I (Inter-War Period)

In order to manage housing problems Inter-war and after- World War I period two main strategies were applied to manage housing problems. These strategies are The Vienna Settlers´ Movement (Wiener Siedlerbewegung) and municipal/communal housing program (kommunalen Wohnbauprogramm) of Red Vienna[2].

2.1. Communal Housing Program of Red Vienna

After the collapse of Habsburg monarchy came to the management of the city council by a majority of 54.2 % in 1919 after the war, a lot of reform activities were realised in Vienna and this process is called "Red Vienna" which continues until 1934. Housing was the main issue of these reforms. An improvement for the prevailing housing shortage could achieve the Social Democratic Workers Party in the late autumn of 1919, when they

2 Red Vienna (German: Rotes Wien) was the era between 1918 and 1934, when the social demo- crats had the majority to govern the city democratically for the first time.

decided to adopt “Housing Promotion Act”. Housing construction had to be redesignated as a primary political program, and this new building policy was shown as a product of idea of social democrats. In this sense, housing for “community purpose” was declared as a social product that offers all requirements according to necessity. According to Weihsmann great reforms in housing and communal politics in the city of Vienna during the regime of Social Democrats were developed on the nationalized network enterprises founded under Karl Lueger (power stations, the central water supply running from the two mountain spring water sources and the community owned natural gas companies) and were not absolutely new inventions. (Weihsmann, 2002)

Fig. 1. *Council Housing (Gemeinde Wien) designation (Wordpress, n.d.)*

The aim of the city administration was low private demand for building land and low building costs in public housing planning. Since then, “Gemeindebau” (council housing) (Fig. 1) has become the nucleus of society and transformed housing from a simple dwelling to a multifunctional structure with education, health and culture, which also employs architecture as a medium to realise a social utopia within these facilities and courtyards offering communication areas. (Förster, 1978) Housing was adressed as a part of social urban development. In order to solve the financial conditions of social housing, some regulations were adopted in 1923 such as new land tax, the increment-value tax and new housing tax according to which a simple worker´s apartment tax was at an average of 2.083 of the rent before the war. The rent of council housing was about 1/25 of the rent, which is needed for refinancing the building costs and bank interest rate, even the value of land had not been taken into account. (Danneberg, 1930) Tenants´ Protections Act was also a reason to accelerate social housing.

Since the attractivity of land speculation had decreased, many owners sold their property to the municipality of Vienna. As a result the city was able to gain large contiguous areas as building areas for the later residential construction program. The municipal land property in 1918 was almost doubled by 1931. (Förster, 1978)

Fig. 2. *Metzleinsthaler-Hof, 1050 Vienna (Ledl, n.d.)*

In this era "Siedlungen"[3] were still built but these housing type shifted to large block construction, which can be described as mass-housing movement with the social Democrats. These are produced in different forms of organizations such as foundations and cooperatives. Shortly after the war some council housing estates were planned such as Metzleinsthaler Hof by Hubert Gessner. (Fig. 2) The layout of this estate had been a standard for the following housing estates. Each apartment has its own toilet and water supply facilities, wohnküche (living room including kitchen which is newly applied in Vienna), a small entrance hall. In some cases there is also an extra cabinett room. Former dark backyards of the pre war housing estates are replaced with green courtyards shaped by surrounding blocks. (Fig. 3) These courtyards are accesible for everyone and provide net safe pedestrian-ways. Another difference from the pre-war housing is the entrances, which are designed to the courtyards on the contrary designing to the street side as before.

3 In architecture and urban planning "Siedlung" is a residential area, which represent a unity, with similar buildings. In this era, mentioned Siedlungs are mostly small scaled in vertical dimension

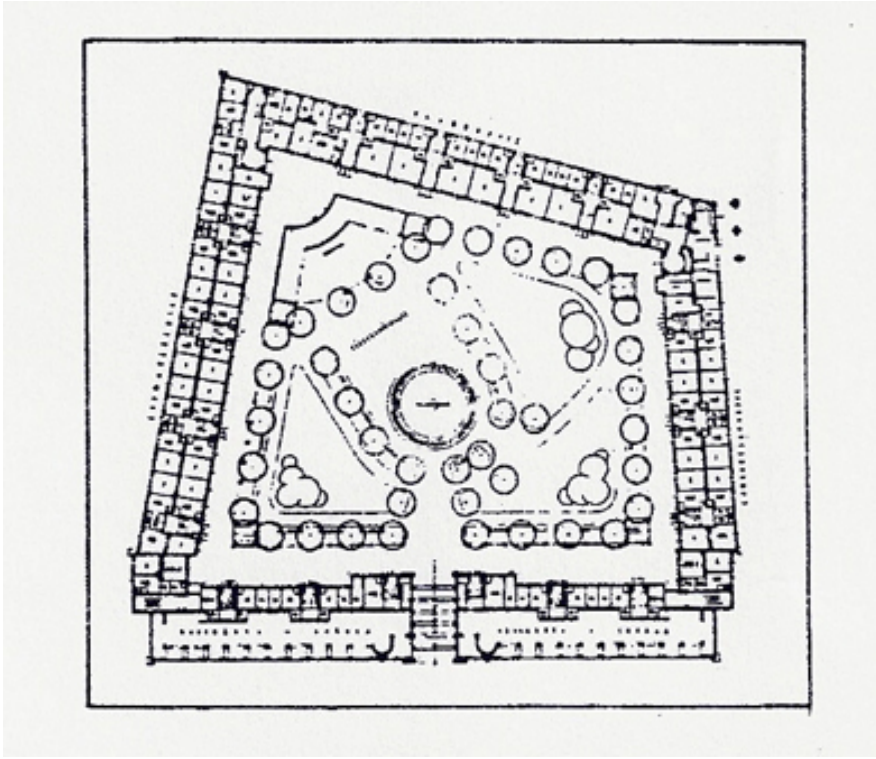

Fig. 2. *Typical peripheral block development (Blockrandbaubebauung)*

August Bebel-Hof, 1925/26, 1120, Vienna. (Fehringer, 1995)

Within the first housing program of municipal council which was a comprehensive building program developed with the newly introduced housing tax in 1923, 25000 apartments were built between 1924-1928 with the concept of mass housing or Siedlungshäuser. There were to types of dwellings within the programme of 1923. These were 35 m2 dwellings with one room, kitchen, entrance and toilet and 45m2 which includes a small bedroom additionally. (Fig. 4) In the following apartments these basic types developed to 57m2 with the inclusion of balconies. (Förster, 1978)Housing estates of the 1920s were easy to recognize because a lot of building parts were standardised such as doors, windows, door knowbs, banisters fittings even garden benches.

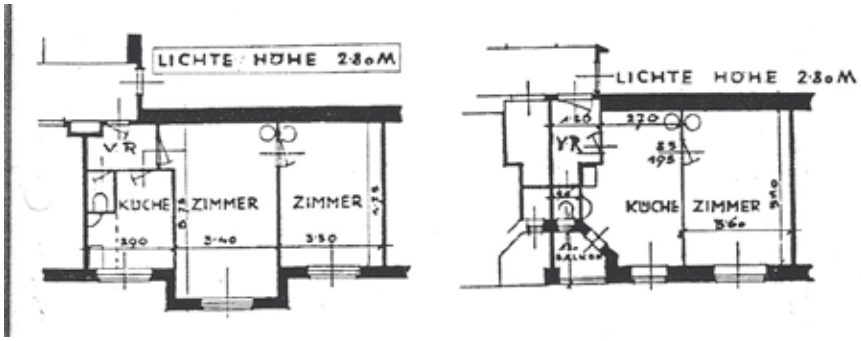

Fig. 4. *Communal housing type of Inter-War Period (Fehringer, 1995)*

A second program followed this with 30000 apartments between 1929-1933 which are high with a tendency to densely built island blocks. (Fig. 5) The aim was producing cheaper construction than detached and terrace houses, which also benefits from the land use.

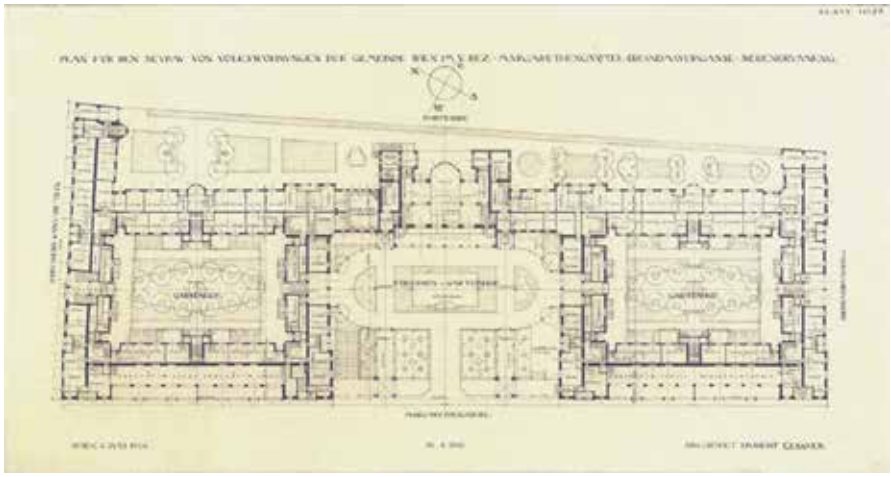

Fig. 5. *Reumann-Hof Floor Plan, (Zednicek, 2009)*

By 1934, 61175 apartment units in 348 council projects are produced by the City Council. (Förster, 1978) These had own common rooms, kindergarten, laundry, library etc. Council houses (Gemeindewohnungen) demonstrated important steps in the development of social and democratic principles in residential projects and even they acted as a city in the city. An enormous development is processed in living standards in terms of quality when compared with the pre-war housing.

The most symbolic building representing Red Vienna is Karl-Marx-Hof, a monumental building group. (Figure 6,7) This housing is designed

between 1927-1930by Karl Ehn. This complex had 1382 apartments, which provided dwellings for approximately 5500 people. This estate had two central laundries, two bathhouses with 20 tubs and 30 showers, a mother information center, two kindergartens, a youth center, a dental clinic, a health insurance ambulatory, a pharmacy, a library, a post office and 25 shops. (Schaffhauser, 1993).

Other well-known architects of these times are Peter Behrens, Josef Frank, Hubert Gessner, Josef Hoffmann, Clemens Holzmeister and Adolf Loos.

Fig. 6. *Karl-Marx-Hof (Ledl, n.d.)*

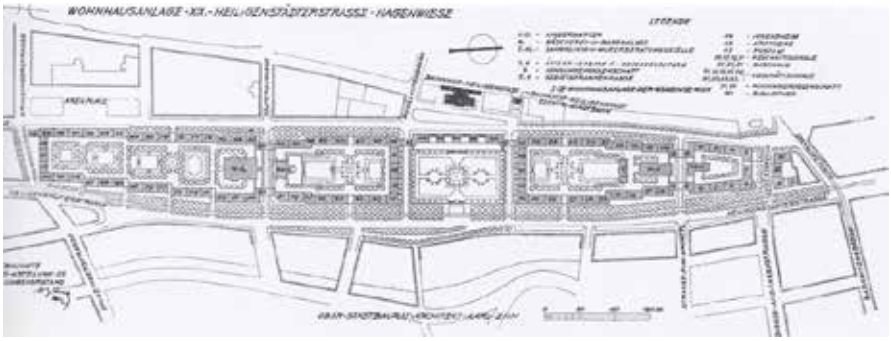

Fig. 7. *Karl-Marx-Hof, Plan and View, 1927-30, 1190, Vienna. (Zednicek, 2009)*

Private architects also participated with new housing projects during Red Vienna by competitions and contracts. The city arranged clear defined instructions in terms of the size of apartments, the amount of infrastructure and the use of standardized building parts. But on the other hand, there were no design regulations and no restrictions to limit the external design of these buildings. Especially during the first years there were not too much argument about architecture of these building except discussions about high-rise versus low-rise buildings. Most of the critics were about the high density because the area that these blocks covered was really in minimum, for instance 30% of total site in Karl-Marx-Hof. (Förster, 1978)

The George Washington Hof on Wienerberg is another representative housing of this era, which is built between 1927 and 1930. It was designed by architects Robert Oerley and Karl Krist. Because of the numerous breakthroughs, there has been some speculations about "overcoming the superblock system". (Weihsmann, 2002)

These housing which is constructed in Red Vienna is defined as "Superblocks". These housing estates had huge sizes and numbers of building blocks, which are built as perimeter block developments (Blockrandbebauung) with a high density. As the size of the plot increased, "superblocks" emerged that functioned largely independently. Because of the similarities to the feudal palace architecture and the sheer size, also called "people's residential palaces", the complexes also represented the aspiring working class. In addition to the architects of the government, over 190 freelance planners were involved in the planning of a total of 384 systems. (Friedel, 2014) The architectural historian Helmut Weihsmann defines the superblock in his book "Red Vienna" with the following words: "both centralized architectural unity and relatively self-sufficient community centre, largely independent of the rest of the city" (Weihsmann, 2002). (Fig. 8)

Fig. 8. *Entrance door, Jean Jaures-Hof, 1925/26, 1010 Vienna. (Schimek, n.d.)*

2.2. Wiener Siedlerbewegung Wiener Siedlerbewegung (Vienna Settlers´ Movement)

The Vienna settlers´ movement was contrary to the municipal housing program (kommunalen Wohnbauprogramm) of Red Vienna and is often called "housing reform from below", because it emerged from the intention of the residents. The basic idea of the Viennese Settlers´ movement was based on the idea of help for self. (Six, 2011)

The housing shortage after war and the cleared forests (in order to be used for the production of fuel) resulted in illegal housing structures such as small cabins in gardens. These were the form of the first settlement structures (Siedlungen). Since the owners of these settlements demanded the legitimacy of the areas with demonstrations, lease contracts were formalized between settlers and landowners (mostly the municipality or the Ministry of Forestry). Mayor Jacob Reumann guaranteed the purchase and development of land, supply of building materials and professional assistance. As a result extremely modest housing estates were supported with cheap raw and building materials. The city established its own Siedlungsamt (municipal settlement office), and the city-owned GESIBA (Gemeinschaftliche Siedlungs- und Baustoffanstalt) took over the mission to deliver building materials. (Weihsmann, 2002). Gesiba was also authorised to build amd manage privately owned housing by the municipality. (Fig. 12)

This movement was a form of housing that originated directly from the people and innovative architects supported this formation in management under the management of municipality. The settlement with 15000 terraced houses under the direction of Adolf Loos is a significant example of these settlements. These settlement colonies were 55% of the whole housing stock in 1921 in Vienna. (Six, 2011) These settlements were generally in form of terraced housing. (Figure 10,11)

The houses of Loos, especially those in Plachygasse 1 to 13, were executed according to his patent "house with a wall". (Figure 9) According to his terraced house concept; dividing walls between the houses were designed as load-bearing walls and placed at intervals of 5.5 meters in a grid-like primary structure [9] and boarded with nailed boards or wooden slats. Outer walls were designed as not bearing walls.

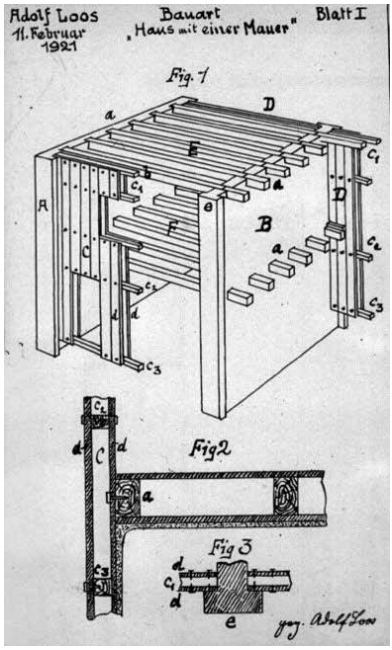

Fig. 9.(Left) *Patent House drawing "House with a wall" of Adolf Loos, 1921 (Loos, 1983)*

Fig. 10.(Right) *A.Loos, Presentation of 5-m Type of a settlement house, View from garden. (Rukschcio, Schachel, & Loos, 1982)*

On the contrary to communal housing of the municipality of Vienna, the residents had to contribute a high share of own funds. In order to organise their resources cooperative allowed incurring their burdens in the forms of working hours. (Marchart, 1984). These settlements achieved a very high construction standard due to the cooperation with the Settlement Office and the participation of the future residents in addition to the architectural quality guaranteed by the collaboration of great architects such as Adolf Loos, Margarethe Schütte-Lihotzky and the two office partners Franz Kaym and Alfons Hetmanek.

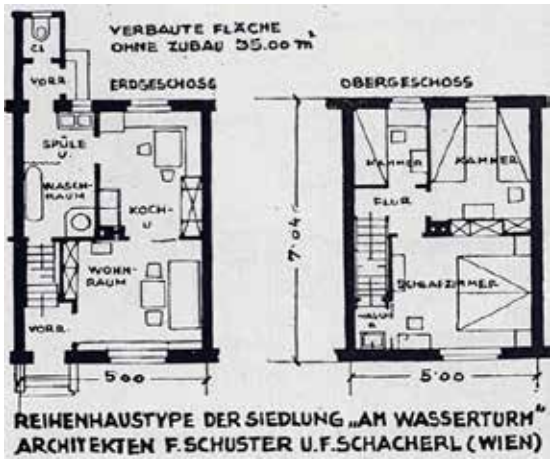

Fig. 11.(Left) *Architects F. Kaym and A. Hetmanek, View to the garden of 5m-Type (Kaym & Hetmanek, 1919)*

Fig. 12.(Right) *Floor Plan of a Settlement of Siedlung "Am Wasserturm", 1923/24, Vienna, 1100 (Keller, 2011)*

3. Housing Development After World War II

Bramhas states that the results of the war in 1945 was different from 1918. The corpses in the street and the enormous mountains of rubble had not existed after the First World War" (Bramhas, 1987) Vienna had suffered a severe damage. of 187.305 apartments were affected with several damages in total. 19.6% of them apartments were totally destroyed, 26.7% of them apartments are severely destroyed and 53.7% of these apartments are slightly damaged. (Marchart, 1984)As a result of this situtation City of Vienna had to response as quickly as possible for this housing shortage. The Housing Reconstruction Act was declared to maintain the restoration and repair of the destroyed houses in the war. (Donner, 2000) Until 1967, 190,000 apartments with a total of 18.7 billion schillings were funded throughout Austria. (Koch, Koch, & Klinger, 1994)

Leopold Thaller, the successor to Franz Novy as the city's leading city councilor for building construction, presented an "eight-point program for social urban planning in Vienna" in 1952, the content of which influenced the urban development of Vienna strongly and whose requirements continue to have an impact even today. These program aims at decreasing the density and the systematical disperse of certain parts of the city which aims to create new green spaces, playgrounds and sports fields in the middle of the city; planning new self-efficient city parts which relocates industry as well as the inclusion of re-thinking all traffic planning; rehabilitating the wild settlements because these slums mean enormous economic losses; pursuing an active land policy, which allows a purpose-

ful new construction of larger closed city quarters and correspond to new social urban knowledge; devoting more protection and attention for the forest and meadow belt because it is unacceptable that these crucial open spaces were disappearing through unsuitable and unauthorized installations. These were focusing on preparing the idea of regional planning with suitable measures in the Vienna city area so that the ground area of the city of Vienna would be planned sensibly and efficiently. (Marchart, 1984)

From 1945 to 1953, the city built 80% of the newly constructed apartments. In 1954 25,000 postwar apartments were completed. Until 1958, the municipality of Vienna saw the expenses for land and buildings (as in red Vienna) as a lost grant. From the year of 1958 the basic interest in the amount of 2% of the construction costs had to be paid annually for newly occupied new apartments, which led to sudden rent increases. (Czasny, 1988)

Per-Albin-Hansson Siedlung (Fig. 13, 14) is the first great representative case of World War II which is realized as blocks of flats in rapid construction program. The settlement with over 1000 apartments (65% two-story single-family terraced houses, 35% three-story apartment blocks) is actually comparable in concept with the residential streets, garden paths and passageways to the 'garden city concept' of the early 1920s, even though the apartment types for the row houses are more sophisticated and have been adapted to the program of the municipality of Vienna for the multi-story apartments. (Achleitner, 1996)Its architectural language is still strongly oriented towards the settlements of the interwar period and the floor plans of the settlement houses are also closely related to the already known buildings from the 1920s. However, the floor plans of the multi-story apartments already show the clear influence of the forties.

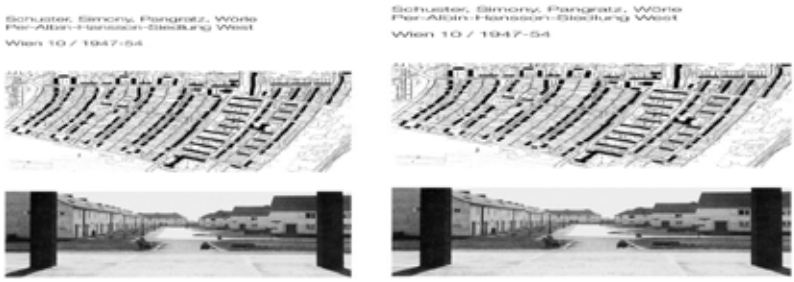

Fig. 13. *Per-Albin-Hansson Reihenhaus (row-terraced housing) (Boeck, 1953)*

Fig. 14. *Floor Plan types of Per-Albin-Hansson Reihenhaus (Förster, 1978)*

With the support of the Swedish aid program the city of Vienna had two vibro systems which created the opportunity to produce new building materials from the available rubble which accelerated reconstruction. At the beginning of the 1960s most of the housing needs were managed in a successful way and the municipality focused on improving housing standards through new construction methods partly with the help of industrialized housing production. The industrial prefabrication of concrete elements was initiated to increase construction capacity while at the same time reducing construction costs. This new technique required precise planning and execution guielines. Consequently, "Montagebau Wien" was founded in 1961with the participation of the city and two construction companies. (Marchart, 1984)

The first prefabrication plant was used in Grossfeldsiedlung which has 5300 apartments realised with panel housing construction. (Fig. 15) This settlement was constructed as a result of a competition.

Fig. 15. *Grossfeldsiedlung constructed through montagebau. (Friedel, 2014)*

Siemensstrasse and Hugo-Breitner-Hof housing estates were other representative housing of after Second World War period. Communal bathrooms were not included in these settlements and all new units were built with their own bathrooms and central heating. (Förster, 1978)

Towards the end of 1960s a significant development in terms of housing quality were provided on which the prefabrication and industrial production had an influence. The improvements of the after-war period have provided a basis for the ensuing success of social housing of City of Vienna, which is today conceived and appreciated.

4. Discussion and Conclusion

Although different places/countries have its own after war conditions and parameters, there are also similar contextual issues all these places are striving for: solutions for housing shortage which can provide long-term solutions for a liveable and qualified living spaces. Since Viennese social housing has a leading potential with its quality, it has a special value to understand the progress until today which is possible with an analyse of previous approaches and experiences.

After this analyse in this research, it is obvious that the onslaught on the municipal dwellings was enormous at that time and it has remained until today. Behind this housing program there was a political program and political decision. It has been a discourse the assessment of the uniformity of these constructions and the approach of community spectrum, which withdraw individuality including an ideological orientation. It is also still an open question why a monumental representative language that claims

power, had been chosen. These superblocks were always expressions of proletarian self-confidence. The critics were questioning if these estates would be built in a way which responses to the needs of the workers with more appropriate formal solutions instead of honorary courtyards, avant-corps, wings and fountains. It could be more useful that proletarians invent their own language in cooperation and codetermination from planning to equipment. Local politics prevailed: °Everything for the people, nothing by the people!" (Weinberger, 2015) Josef Frank indicates that these housing estates not only in the external monumentality, but also in the floor plans don´t correspond to the living habits of the workers (ex: disappearance of the division of living room and kitchen) (Achleitner, 1996)

The financiering of this municipal construction program came mostly from their new tax system. The council dwellings were awarded according to a sophisticated point system, which favoured young families and homeless people. The rents were extremely low cost. According to that system tenants of small dwellings pay 2% of the pre-war rent, renters of the luxury apartments pay up to 36% of the pre-war rent.

The strategy of Settlers´ Movement was also a good strategy to response housing shortage. The proportion of settlement houses in the entire construction program was vanishingly small and was unfortunately only 5% in 1925 although this share had been 55% in 1921. When the international urban construction congress was held in Vienna in 1926, the discussion about the topic "superblock versus garden city" escalated. A total of 1,100 people from all over the world participated. The theme dominating the congress was the question of the rational distribution of single and multiple dwellings in Vienna. Most of those were favouring low-rise housing in the form of settlements and criticized the newly built mass tenement houses of the municipality of Vienna. It is thought that the best form of living of the broad masses of the population is the flat building, the single-family house with garden: the settlement. (Klaus & Förster, 1985) On the other hand the group of Social Democrats, who spoke out against small-house construction for ideological reasons, justified this idea with the argument that the small-town settlements intended a demobilization of the workers, which makes them as a homeowner "philistine". Although they believed that only in the large housing estates with large courtyards and many community facilities, could provide a sense of community and solidarity mature, the majority of the settlers did not confirm this idea. (Förster, 1978)However, the settlement estates were occupacing too much ground floor and these were on difficult and uneben construction areas, which make the transport of the building material extremely cumbersome and costly. So, the settlement became the most expensive facility of the interwar period in Vienna which is not preferred as a prevalent type by the City Council.

Even though the communal housing in Red Vienna is discussed to be a symbol of power and its architecture demonstrates an expression of that social utopia, it was really successful in order to supply housing shortage. In no other European country so much buildings were built in this short span of time. (Weihsmann, 2002) The residential standard of communal apartments was qualitatively enormous from those of the pre-war period. The addition of the big courtyards to the estates offered as an additional living space which tenants can take the opportunity to enjoy fresh air and communication between neighbours. Also, the shared facilities in these estates were not enough in some cases but it can be concluded that they brought a quality to the community. This quality was reflected less in housing sizes, but rather in the new infrastructural and hygienic achievements. The apartment sizes were relatively small, about 75% of the apartments, which were built in the course of the first construction program had a size of only 38m^2 and consisted of a room, kitchen, entrance hall and toilet. The remaining 25% of the apartments had a size of 48 m^{2}adapted to the historically developed city structure, the municipal buildings became "icons of this communal housing architecture"; until today, any building has not been demolished.

The restoration and repair were also an additional strategy after World War II as a result of the housing opportunities provided in Red Vienna. The architectural characteristic of the housing developed before 1945 had been maintained with some improvements provided with the support of the technology and a better sensitivity in terms of better urban strategies. Although prefabrication was criticized for causing a monotony of the architectural design, the built apartments in Vienna with this technique were well-accepted by the inhabitants and never became place of vandalism or abandonment as it had been predicted.

Some different concepts related with quality followed above-mentioned developments. Within the time quality gained more importance than quantity regarding social housing in Vienna. There had been a shift with an understanding which is directed mostly according to People's needs and requirements. As a result, the Viennese Housing Funds foundation has been established which was an important milestone for the quality of social housing in Vienna. There were first time intensive efforts by the city to increase the quality which did not mean only the quality of the property but also the urban development and the architectural quality and the conceivability of tenants. But the roots of these new developments including "rethink of the housing conditions" in consciousness was embedded in the previous efforts of City of Vienna.

As a conclusion, all these experiences can shed light into today's post war housing and urban development with its success as well as its failures.

Today it is crucial to take lessons from failures and improve the strategies that provide success with the contribution of new technologies in a sensible balance in order to provide a more qualified residential areas for their inhabitants.

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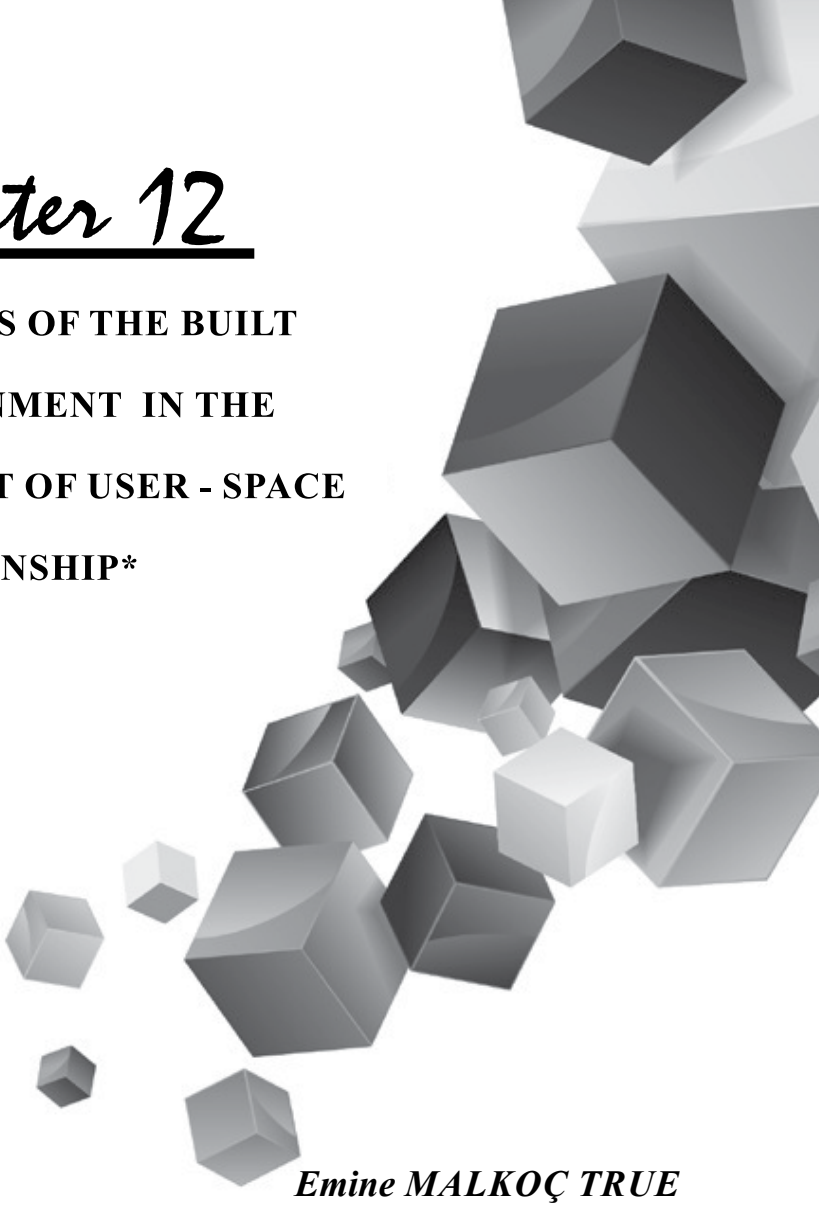
Chapter 12

ANALYSIS OF THE BUILT ENVIRONMENT IN THE CONTEXT OF USER - SPACE RELATIONSHIP*



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INTRODUCTION

Understanding the relationship between people (society) and their environment (space) is an essential component of urban design. Consideration of the relationship between people and their environment starts with architectural or environmental determinism, where the physical environment has a determining influence on human behaviour. But, by negating the role of human agency and social influences, it assumes environment – people interaction is a one-way process (Carmona et. al, 2010). The interaction between users and the physical environment is interpreted on the basis of environmental psychology and both the effects of environment on the users' behaviours and the effects of the users' various activities on the physical and social environment are determined within these types of studies (Malkoç True et. al, 2014). People's mood and wellbeing are affected by various elements of the built environment including spatial allocations, lighting, access to nature, color, indoor air quality, noise, thermal comfort, user control of space, and preferred environment (Charnofsky, 2012).

Cities that provide people with the opportunity to meet, interact with, and interact with the different can offer this opportunity to individuals through many tools. The most powerful element of these vehicles in urban areas is undoubtedly public spaces (Uzgören and Erdönmez, 2017). Public spaces, which are a very important component of the urban fabric; transforming into living spaces that meet the needs of the city people, which is used every day of the week and every hour of the day, will also contribute positively to the strengthening of urban identity (Altug Turan and Malkoc True, 2019).

The aim of improving the quality and quantities of public open spaces used by each group of people who are in different ages, genders and occupations, is upgrading the users' life quality by equipping these places with various functions and to make the urban life more attractive and meaningful by creating livable environs. Also the basic approach on developing public open spaces which have been constructed in the aspect of users' expectations is to form environments which can be used by all age groups of people. Because the ability of using the public open spaces by different groups of people is a success indicator of those spaces (Sönmez Türel et. al., 2007).

The liveability and quality of public outdoor spaces is the result of the relationship between the space and the users of this space, and quality and liveability develop in parallel with the intensity and diversity of this relationship. The importance of the liveability and the quality of physical environment is increasing day by day and the studies about visual analysis

have an important role on increasing the quality, defining and recovering the problems (Malkoç True et. al, 2014). In this context, this study aims to analyse a built environment in the process of use and to try a participatory method in the process of analysis, based on the environmental psychology that deals with the interrelationship of the place and the human being who is the user of that place.

MATERIAL AND METHODS

Bornova Büyük Park, which is located in Kazım Dirik Region of Bornova District in the northeast of İzmir, is the main material of this study. Bornova Büyük Park is located between Fevzi Çakmak Street, Süvari Street, 155 and 156 Streets and it is a 38.150 m² neighborhood park (Figure 1).

Figure 1. Location of the research area.

The area where the park is located, is the oldest cemetery in Bornova history that belong to Ottoman period (Evren, 2019), Arranged as a parking area during Governor Rahmi Bey and it was further developed in the 10th year of the Turkish Republic by Governor Kazım Dirik Pasha (Tarihi Mekanlar Kişisel Ansiklopedi, 2019).

Bornova Büyük Park that was opened in 1934, today it is Bornova's one of the public places that has a highest user potential. The park, which has a very wide range in terms of user diversity, is also very important for Bornova district in terms of history. The research area is also important because of its location surrounded by residential areas, commercial areas and public service buildings. In addition to access by pedestrian, private and commercial vehicles, there is also possibility to reach by public transport, bus, metro and minibus. Due to its easy accessibility and proximity to other uses, it caters to users of all ages from 7 to 70 years.

Especially because of the density of the student population in the district, it attracts a lot of young people.

The starting point of this study is to visually analyse Bornova Büyük Park to interpret the relationship between physical environment and user behaviour by examining its characteristic structure. The study was carried out as a term project within the scope of Environmental Psychology course of 2018 - 2019 Academic Year's Fall Semester. The study was performed by 24 groups (1 - 3 people in each group) and in total 50 students participated in the project.

The research consists of four main stages:

Conceptual Framework: This stage is consisting of literature studies on the spatial characteristics of the research area and the subject of the research and also preliminary observation studies to understand how the space is used.

Data Collection: Visual analysis research method was used in the study. Ege University Faculty of Agriculture, Department of Landscape Architecture Grade 4 students supported the study as assistant researchers. The students first visited the research area with the help of the research team and then visited the place frequently to carry out their individual studies. During these visits, the students conducted observation studies under the guidance of the "work preparation instructions" given to them at the beginning of the semester.

In order to put forward "work preparation instructions", Sönmez Türel et. al (2007), Malkoç (2008), Kilicaslan et. al (2008), Malkoc et. al (2010), Malkoç True et. al (2014), Malkoç True and Özkan (2014), Malkoç True and Sönmez Türel (2017) were used in addition to the approaches of the research team. The "work preparation instructions", which has been prepared originally for this study, consists of 3 main stages. In the first stage, the research area was evaluated in general (first impressions, factors affecting visual quality, features that make the study area different).

In the second part, the research area is evaluated with its **sensorial** (sensations in the perception process), **spatial** (building space / open space relationship, the quality of outdoor reinforcement elements, space transitions, existing subspace types, space action) and **social** (user information, the types of social interaction they exhibit, activity types, user behaviour, environment - behaviour relationship) aspects. In the last stage, the passive / active activities performed by the users were observed and interpreted, the used and unused parts of the area were identified and the effect of the observed positive / negative environmental factors on the user behaviour was revealed.

Research Findings: The findings obtained from literature studies, field studies and observations and also analysis studies were evaluated on the basis of environmental psychology.

Conclusion and Recommendations: The results of the analysis were discussed on the basis of user - space relationship of the research area and some suggestions were made.

RESULTS AND DISCUSSION

Findings from the 1st Stage of the Research

In the first stage, the study area was generally photographed and evaluated visually. In these evaluations; the first impressions of the environment, the factors affecting the visual quality (Table 1 -7) and the characteristics that differentiate the place / settlement were taken into consideration.

Table 1. The first impression of the environment – Access and Linkage

ACCESS AND LINKAGE	Positive	▪ Easy access to area and transportation alternatives are available ▪ The main entrance is inviting ▪ Secure entry and exit ▪ Disabled access is present ▪ Central location ▪ Buffer between residential and business ▪ Close to public services	
	Negative	▪ Main entrance door opens to a street exposed to heavy traffic ▪ No continuity in the area's circulation ▪ No parking space ▪ Entry gates are unclear / undefined	 

Table 2. The first impression of the environment – Usage and Activities

USAGE AND ACTIVITIES	**Positive**	▪ Rich in sub-areas ▪ Variety of activities and facilities are present ▪ Design fiction is dynamic ▪ Square sub-area is strengthened by the attractive effect of water ▪ Surroundings are dynamic and active	
	Negative	▪ Transitions between sub-spaces are broken ▪ The concrete perception of the ornamental pool and water show area is too high and its working period is not clearly defined ▪ There is insufficient use in winter months and in this period it is only used for transition purposes ▪ Reinforcement elements are outnumbered and uniformly distributed throughout the area ▪ Unprotected against negative factors of climate	 

Table 3. The first impression of the environment – Comfort and Image

COMFORT AND IMAGE	**Positive**	▪ Historic entrance door ▪ Secure ▪ Compatible with evolving technology ▪ Animal friendly ▪ Atatürk monument ▪ Ability to provide boundary permeability and privacy ▪ Positive contribution to biodiversity	
	Negative	▪ Colour is not considered as one of the design principles of plant material selection ▪ Night lighting is inadequate in some parts of the field ▪ Maintenance - repair - management work is insufficient in some parts of the field ▪ Digital screens are more in quantity and size than needs ▪ Public WC is not present	 

Table 4. The first impression of the environment – Sociability

SOCIABILITY	Positive	▪ The structure that appeals to users of all ages ▪ Focus / Meeting point ▪ Contribute to socialization of society ▪ Especially successful in attracting young population ▪ Positive impact on microclimate ▪ Legible ▪ It hosts street artists ▪ The important presence of Down Café ▪ Presence of Çınar House	  
	Negative	▪ None	

Table 5. The factors affecting the visual quality – Positive

POSITIVE	Natural	▪ Rich green texture ▪ Good relationship between plant material and sub-spaces ▪ Topiary plants ▪ High potential for sunlight ▪ Cool and shady spaces available	
	Cultural	▪ Historical background ▪ Remarkable dry fountain supported by lighting and music ▪ Interesting and modern products in the children's playground ▪ Various plastic items, sculptures, wall art samples etc. available ▪ Suitable pavements with general design concept	

Table 6. The factors affecting the visual quality – Negative

NEGATIVE	Natural	▪ Grass areas are not maintained ▪ Some plants are diseased	
	Cultural	▪ Orientation boards are not maintained ▪ Some of the plant pots are broken ▪ The distribution of trash bins in the park is random ▪ Some of the structural applications are incorrect ▪ There are cracks in the walking paths ▪ Irrigation hoses and electrical cables exposed ▪ Vandalized materials / equipment ▪ Some structures / elements or objects create visual pollution ▪ Pavements and borders are random and poorly maintained ▪ Main entrances are designed differently / disharmonious ▪ Visual pollution exists due to the poor quality of different types of pavements ▪ Drainage problems exist ▪ Seating and lighting elements poorly maintained, some not ergonomic ▪ Facades of eating and drinking spaces are not harmonious with the overall design concept of the park ▪ The sandbox in the children's playground is poorly maintained, insufficient shading ▪ Animal toilets and water / food containers are poorly maintained	   

Table 7. The characteristics that differentiate the place / settlement

DIFFERENCES	▪ The area serves as a focal point due to its central and easily accessible location. Having been in use since 1934, the park is well known and brings vitality and movement to the nearby environment. ▪ The park offers several activity opportunities to its users, with buildings equipped with different functions, statues, plastic elements, examples of wall art, and animal houses (cat and dog houses, bird nests, etc.) which overall go far beyond the expectations of a neighbourhood park. ▪ The children's playground has been recently renovated with a barrier-free design approach and the presence of the Down café in the park helps raise awareness of the condition. In addition to the rich vegetation, the park has contemporary touches that incorporate the latest technologies. ▪ With the park's Çınar House, the old-age segment of society is catered for, thus strengthening the feeling of the park serving users of all ages.	  

Findings from the 2nd Stage of the Research

In the second stage, the study area was examined in sensorial, spatial and social aspects (Table 8 -10).

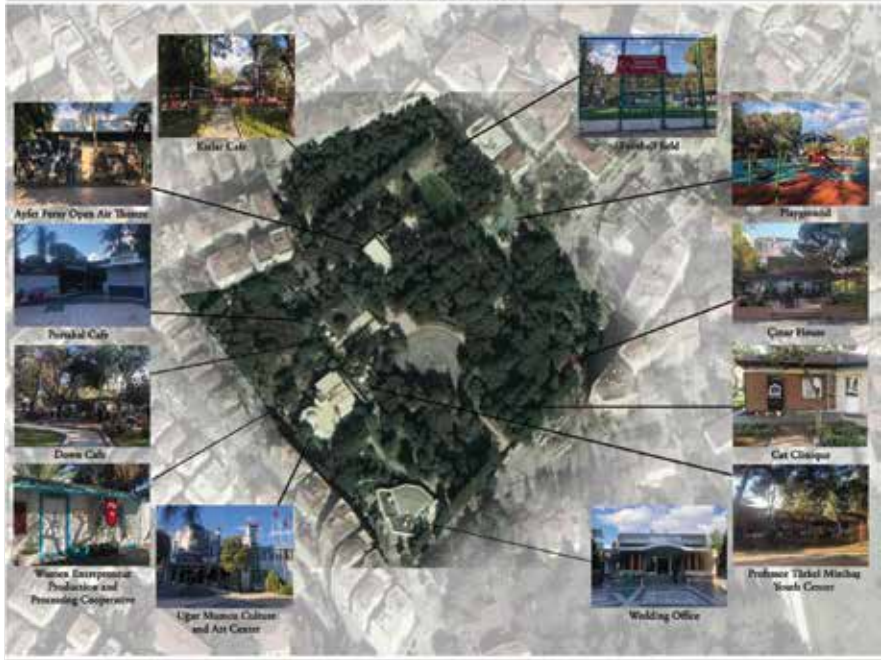
Table 8. Sensorial evaluation

-	1	2	3	4	5	+
Closely spaced				4		Roomy
Annoying				4		Hearty
Boring			3			Attractive
Noisy			3			Quite
Irregular			3			Regular
Disproportionate				4		Proportionate
Unkempt		2				Well - kept
Unsafe			3			Safe
Passive					5	Active
Untraditional			3			Traditional
Distributive				4		Relaxative
Monotonous				4		Variable

Table 9. Spatial evaluation

Built Space / Open Space	1/3 - 1/4	Space Transition	Sudden	Action of the Space	Dynamic
Quality of the Urban Furniture	Seating: High	Shading: Low	Lighting: Medium	Trash: Low	

SUB - SPACES



SERVICES

- Municipality
- Nursing House Solidarity Association
- Wedding Office
- Directorate of Financial Services
- Cat Clinique
- Women Entrepreneur Production and Processing Cooperative

PLAYING SPACE

- Children Playground

SPORTS SPACES

- Football field
- Mini Golf Field

EATING SPACES

- +1 Down Café
- Orange Cafe
- Kafe Look Restaurant
- Kızlar Café
- Çınar House (for Elderly)

MEETING SPACE

Square

SOCIO–CULTURAL SPACES

- Ayfer Feray Open Air Theatre
- Uğur Mumcu Culture and Art Center
- Professor Türkel Minibaş Youth Center

Table 10. Social evaluation

User Information	Gender	Female and male user homogeneous and balanced
	Age	All age groups
Social Interaction	Solitary User (SU), Two People (TP) and Small Group (SG)	
Activity Types	Active	▪ Dog walking ▪ Skating ▪ Photographing ▪ Running ▪ Play ▪ Cycling ▪ Passing ▪ Walking ▪ Sports activities
	Passive	▪ Waiting ▪ Seating / Resting ▪ Picnic ▪ Chatting ▪ Observing ▪ Listening to music ▪ Reading ▪ Eating-Drinking ▪ Doing homework
User Behaviour	Self-Focused, Observing User, Verbally User and Active User	
Environment-Behaviour Relationship	User behaviour is compatible with environment and a part of daily life	

Findings from the 3rd Stage of the Research

The fact that the research area is close to a wide variety of structures providing settlement, trade and public services has a positive impact on its use. The square subarea supported by a dry fountain is the focal point of the park.

Throughout the year, especially the scientific / cultural / sports activities organized by the municipality make the area even more active and directly affect the intensity of the users. Some parts of the area cannot be used as there are no sun / rain protective covers on extreme hot or rainy days when climate conditions are not suitable.

Outdoor areas are preferred on days when climate conditions are favorable, and indoor areas are more preferred on days when climate conditions are unfavorable.

The children's playground is rich and playful by various play elements and is used extensively by families with children. Students from nearby schools usually sit in the grass areas and use the children's playground and sports area. The youth center is used extensively at noon due to the fact that it serves free meals, and themed cafes are in high demand on weekends, match days and public holidays. It is remarkable that families often use the area for picnic activity.

It was observed that some sections of the park were not used sufficiently, especially in the late hours of the day due to insufficient night illumination and lack of seating elements.

The presence of different activity opportunities in the research area positively affects the use. Users can spend a long time in the area, and the presence of items worth taking photos (plastic arts, sculptures, examples of wall art, etc.) directs them to the area. The main disadvantage of the area is the lack of a designed parking area only for park users who come to the area with their private cars. This is a factor that reduces the service radius of the park.

The area is being used by young and middle-aged users for sports purposes in the morning; by elderly users and parents with children for chat, sit, rest and use playground purposes in the afternoon, by university students mainly used for entertainment purposes in the evening. During the field studies, the noise caused by the open air theater and the football field in the area was rarely mentioned as a negative environmental factor.

In addition, since the area forms a border to the main road, it is stated that there may be noise due to the heavy traffic in the region, especially in the morning and evening hours. However, this situation has emerged as a factor that reduces comfort rather than a negative environmental factor affecting usage.

CONCLUSION

The research area is indispensable for Bornova District of İzmir City with its structure that embraces the society in general. Considering thedense urban life in its close environment, the research area can be defined as a rescued region for the district that meets the recreational needs of the public and serves all segments of society at the same time.

The user – space relations in a public outdoor space based on environmental psychology was put forward and the problems were determined with this research.

The local authorities have also tried to show the necessary importance to this place which has been adopted by the people of the city and the place has been renewed in some periods by taking into consideration the changing conditions and the requirements that have emerged since its establishment. However, since these renovation works were carried out piece by piece, integrity could not be achieved throughout the park, especially in terms of constructional elements. In addition, it has been observed that some parts of the park, which has a wide perspective in terms of variety of activities, cannot be used. This is due to the fact that the vegetative texture is damaged and not renewed in these sections and the insufficiency of the lighting elements negatively affects the use of night by reducing the psychological safety comfort.

Considering all these factors mentioned above, an action plan should be developed to provide more effective use of the research area, increase visual quality throughout the area and ensure design integrity.

Within the framework of this plan;

Standardization of all structural elements throughout the space should be ensured.

Style compatibility and language unity in terms of design characteristics should be established among all buildings, especially themed cafes in the park.

Lighting, seating etc. equipment should be completed in parts where they are missing.

The quality and density of plant material should be increased where needed.

A maintenance and management program for the park should be established and efforts should be made to ensure that this plan is sustained every time even if the local government changes.

On the other hand, in the long term, considering the use of the surrounding environment, the roads in contact with the park in the middleof a wide range of pedestrian circulation and the axes connecting these roads to important focal points such as city square, subway, university and hospital should be closed to vehicular traffic and pedestrianized. In addition to these applications also car parking alternatives can be created for the research area in which no parking facilities are available.

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