

**SAUC**

**Street Art and  
Urban Creativity**

Special Issue:  
Urban Landscapes  
Vol. 8 / N° 1

Title:

Street Art and Urban Creativity

Editors:

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Lisbon 2022

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ISSN

2183-3869 (Print);

2183-9956 (Online)

All authors declare  
no conflict of interests.

Gökçen Firdevs Yücel Caymaz (who created all the article  
authors groups) and other authors took part in this issue as  
invited authors with their articles.

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## Preface

Assoc.Prof.Dr. Gökçen Firdevs Yücel Caymaz – Istanbul Aydın University

The issue focuses on philosophies and designs that shape our cities on a broader scale; exploring different approaches between architecture, built environment, and nature; from material to medicinal plants, from plant scale to urban and social sciences. The issue examines the natural and built environment in Istanbul through the relationship between urban planning, urban space, architecture, and landscape architecture. It focuses on designs made in different parts of Istanbul between natural areas and built areas in the city.

The urban landscape is an effective and important design process that includes the interaction of architecture, city planning, and landscape architecture disciplines and creates the living environment of people within and between buildings. It has a complementary and important effect in the process of providing and maintaining the physical, physiological, psychological, and social needs of its users. It covers structural design and furniture location selection and design as well as planting. The special issue on Urban Landscape covers this concept; It has a content setup that starts from the upper scale and shrinks towards the building scale.

The first article includes the planning and design of a medicinal plants garden, which is used in the design of healing gardens, which assumes the function of a landscape area in increasing the herbal landscape areas in the urban environment, in the nature and design approach, which is gaining importance today.

The second article covers the examinations made on the selected shopping centers in Istanbul of the checklist created to ensure the sustainability of planting and structural design issues in building environments.

The third article aims to determine the spatial characteristics of the design of marketplaces around urban spaces. The fourth article, using the Urban Space Syntax method, investigated the relationships between pedestrian activities and land use at the scale of Kadıköy Square in Istanbul. The fifth article tried to analyze the user moving behaviors around the square as a continuation of pedestrian movements.

The fourth, fifth, and sixth articles include urban furniture design complementary to urban landscape design. The sixth article deals with the criteria of urban furniture design in historical places, the example of Hagia Sophia - Sultan Ahmed Square. The seventh article considers the relationship between water element design and user preferences, of five important square users in Istanbul. The eighth and last article examines parklet planning and design, which has a very limited sample in Turkey.

Considering the methods and results of all articles, increasing the quality of urban landscape environments and ensuring their sustainability for the future constitute the content of this special issue.

## From Mistletoe to Anthroposophical Architecture: Medicinal Plants Gardens

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### Abstract

This article focuses on the Austrian philosopher, social reformer, and architect Rudolf Steiner's approach to design, architecture, and nature through its anthroposophical thinking about life developed in the 1920s and its reflections on urban space. The article aims to establish a new relationship between art, design, architecture, and landscape, based on Steiner's approach to life, and to fill the gap in how to look at our artificially constructed environment, especially in urbanized areas. As a medicinal plant, mistletoe is one of the parasitic plants that points to the interplay that Steiner observed throughout life. In this article, the concept of "from mistletoe to architecture" is evaluated as a metaphor and represents the view through the holistic relationship established between architecture, nature, and landscape. From the architectural point of view of mistletoe, the bond between them is understood with a holistic approach in which different disciplines, knowledge, interaction, and living together with plants are intertwined in modern urban spaces. Therefore, how can architecture, landscape architecture, and design practices integrate living and being in today's world? Deriving from this, the article evaluates the close relationship between human beings and plants through the medicinal plant gardens in Istanbul and especially the Zeytinburnu Medicinal Plants Garden.

### Keywords

anthroposophy; holistic approach; design and nature; medicinal plant garden

### 1. Introduction

Based on the holistic approach to design, architecture, and nature through the anthroposophical thought of the Austrian philosopher, social reformer, and architect Rudolf Steiner, this article focuses on co-existence with plants in the modern urban space. While doing this, the article evaluates this close relationship between human beings and plants through the medicinal plant gardens in Istanbul and especially the Zeytinburnu Medicinal Plants Garden. The article aims to understand the relationship between art, design, architecture, and landscape, based on Steiner's anthroposophical approach. Building on this approach, the research aims to bridge the gap between how we view our artificially constructed environment, particularly in urbanised areas.

The aim of this article is to address the connection between holistic design and anthroposophy. Although Rudolf Steiner is known for his works in architecture, he should be approached from a different perspective because of his versatile scientific perspective. Therefore, this article focuses on the phenomenological approach to understanding architecture from the perspective of nature. What does Steiner's anthroposophical approach remind us of in our contemporary urban nature today? In this article, an evaluation is made on how we interpret the built environment in nature at the intersection of disciplinary knowledge within the framework of the anthroposophical approach.

Rudolf Steiner's idea of life, who developed his theory of anthropology in the 1920s, gains importance because it brings a holistic perspective to life and living things. Steiner's anthroposophical approach is an extension of a world we often refer to today, but because of the disconnection of disciplinary knowledge, there is nevertheless a strong need to reconsider and connect them in our built environments. The anthroposophical approach that Steiner articulated in the mid-1920s may not be easy for the creation of today's complex, heterogeneous and multilayered urban environments, but some of the inferences we make at this point can be useful in remembering or reinterpreting how we position ourselves in the world. Steiner's approach gains importance to show that disciplinary knowledge and expertise can be at different stages and levels in nature's cycle.

In this context, as architect Michael Weinstock mentions: Non-living forms, the forms of the land, the forms of clouds, of snow and storms, of dunes and rivers, are not permanent, static things but are dynamic three-dimensional patterns that are produced by the continuous physical processes of the natural world, and are constantly being broken down and renewed. Living forms, the forms of grass and trees, of fish, reptiles, birds and mammals, are also subject to change but persistent over time, organised by their internal biological processes and by exchanges with their environment (Weinstock, 2008, p. 21).

This idea of Weinstock is similar to the relationship that Steiner sees in the whole of life. So how can awareness of these patterns be provided in the design of urban areas?

In his work in the 1920s, Steiner discovered the healing properties of mistletoe (*Viscum album L.*) for many diseases and used it in the treatment of patients. As a parasitic plant, mistletoe points to a mutually influencing relationship that Steiner observed across all of life. In this article, the concept of "from mistletoe to architecture" is taken as a metaphor and represents the view through the holistic relationship established between architecture, nature, and landscape. The connection that emerges from the perspective of "from mistletoe to architecture" goes through a holistic view in which disciplines, knowledge, and inter-

action are involved. After discussing Steiner's approach in the first part of the article, Zeytinburnu Medicinal Plants Garden, which establishes an internal relationship between architecture, landscape, and nature in Istanbul, will be evaluated from a holistic perspective.

## 2. Rudolf Steiner's Anthroposophic Approach to Life and Health

Rudolf Steiner (1861-1925) is known as the founder of anthroposophy, an approach that ranges in a diverse area of disciplines such as "education, biodynamic agriculture, politics, banking, poetry, and drama (Hammer 2009: 209)" (Cusack, 2012). He "saw architectural creation as a means of apprehending our place in the cosmos and his esoteric system of Anthroposophy aimed to demonstrate the correspondence between the spiritual and material worlds" (Gray, 2010, p. 43).

"The term "anthroposophy" comes from the Greek roots *anthropos*, meaning "human," and *sophia*, meaning "wisdom" (Sokolina, 2016, pp. 53-54). Steiner addressed the spiritual essence of the term: "Anthroposophy is a path of knowledge aiming to guide the spiritual" element in the human being to the spiritual in the universe" (Sokolina, 2016, pp. 53-54). By manifesting the idea of spiritual organic learning as a core value of social development, anthroposophy opposes soulless technical advancement as a means of human survival. Steiner identified bio-spiritual awareness "as an essential need of life", an evolutionary natural experience "of the human being and the universe" (Sokolina, 2016, pp. 54). According to Steiner, "anthroposophy not only deepens our thinking, our intellectuality, but also our feeling—indeed our whole nature" (Steiner, 1924). He combined anthroposophical philosophy with humanities and medicine, theosophy, pedagogy, architecture, and spiritual science. However, knowledge and practice lie at the intersection with an underlying theory-action intersection and an open and fluid approach.

Steiner developed the anthroposophic approach by being influenced by Wolfgang von Goethe's "theory of natural life cycles and studies in biology" (Sokolina, 2016, p. 52). In Dornach, Switzerland, he designed a building named Goetheanum, which he dedicated to Goethe, and repre-





**Figure 1.** Topography of the region (Marcolung, 2017) (left), Second Goetheanum in 2005, Photo by Roland Halfen. Rudolf Steiner Archive, Dornach, Switzerland (right) (Rudolf Steiner Archive, 2021)

sented his approach to anthroposophy in 1923 (Sokolina, 2016, p. 52). Originally surrounded by cherry trees in a rural area, the Goetheanum building and park serve as research and training spaces with competent groups of gardeners and farmers (Florin, 2022). Located to the west of the Goetheanum, the circular landscape feature footpaths, the “Felsli” feature, and the shaping of the land were all done at the time of the first built Goetheanum building (1908-1925). However, after the first building built as a timber and concrete structure was destroyed by a fire in 1923, a new Goetheanum building was designed and constructed by Steiner between 1924 and 1928. In the process, the park continued to provide various opportunities for “recreation, recuperation, biodiversity, and ecological sustainability” (Goetheanum, 2019, p. 12).

The building emerges not as a concrete spatiality of his thought, but as a practical proposition that evolves into a comprehensive representation of an interdisciplinary vision. Close to the building, there is a therapeutical center for healing that applies anthroposophical knowledge. Steiner mentions:

...the world must include not only an understanding of the healing processes but also of the processes of disease. A profound insight into the Cosmos is only possible when we are able to survey not only the tendencies which lead to sickness but equally those which lead to health (Steiner, 1924) (Figure 1).

Goetheanum shows the “spiritual evolution of material living in sustainable balance” which combines “human physicality and spiritual awareness” representing the influence of organic thought on contemporary architecture” (Sokolina, 2016, p. 52). This building becomes a place where anthroposophic medicine, which was founded by Steiner and Dr. Ita Wegman in 1920 as one of the 11 disciplines of the School of Spiritual Science founded by Steiner, is practiced. The school focuses on the “development, teaching, and the practical implementation of its research findings and is supported by the Anthroposophical Society” (Goetheanum-School of Spiritual Science (n.d.)). The Medical Section of this school coordinates not only research and development of anthroposophic therapy but also applies various forms of therapy. In the branch of anthroposophic medicine, drug therapy, body-oriented therapies, nursing

applications, curative eurythmy therapies, art therapies such as painting and psychotherapy, as well as veterinary medicine are used as part of the integrative patient treatments (Anthromedics, Arzneimittel und Therapien, 2018; IKAM Arbeitsfeld Therapien (n.d.)).

In 1920, Steiner introduced mistletoe as a cancer treatment and he “recommended a drug extract produced in a complicated manufacturing process combining sap from mistletoe harvested in the winter and summer” (Szurpnicka et al., 2020, p. 594). Mistletoe (*Viscum album* L.) as a medicinal plant attracted Steiner and Dr. Wegman, and they used “a mistletoe extract to treat a cancer patient for the very first time”, in 1917, before the foundation of the School of Spiritual Science (Isador AG. (n.d.)). They prepared “the basis of the pharmaceutical and therapeutic concept of anthroposophic mistletoe preparations (Isador AG. (n.d.)). Steiner referred to the mistletoe as a parasitic plant as “it grows on trees is compelled to follow a different yearly rhythm from that of other plants, its blossoms have been formed before the trees which are its hosts, put forth their leaves in spring” (Steiner, 1920). Mistletoe is a “winter-blooming plant, protecting itself under the shelter of alien foliage, from the extremes of the summer sun’s rays, or better, from the light workings of summer; there is something of an aristocratic attitude about the mistletoe” (Steiner, 1920). A mistletoe also exists in “legends and myths, because it belongs to an earlier planetary condition of our earth and has remained behind as a remnant of a pre-earthly evolution. This is why it cannot grow on the earth but must take root in other plants. Natural science shows us that mistletoe does not have those curious starch cells that orient the plant toward the centre of the earth” (Steiner, 1910). Steiner defines the characteristic of mistletoe as:

...the mistletoe attaches itself to other plants in order to grow and thrive is the essential point: it acquires and appropriates particular forces”, “its nature is to oppose all the tendencies of the straight course taken by the organic forces, and to urge towards all that to which the straight course taken by the organic forces is opposed (Steiner, 1920).

Since then, mistletoe has been used especially in integrative oncology, as it has been found to be an “adjuvant treatment of tumorous diseases is developed on the basis of anthroposophic medicine” (Isador AG. (n.d.)). Today, “anthroposophic mistletoe therapy is widely used. Preparations of white-berry European mistletoe (*Viscum album* L.) are among the most frequently used medicines for cancer” (Mistletoe Therapy, 2020).

Steiner’s multifaceted and layered approach to the holism of plants and life is not applied in many societies in today’s modern and fast life. In their book, *Time-Saver Standards for Landscape Architecture: Design and Construction Data*, Harris and Dines define the important functions of plants in urban environments as; aesthetics, environmental modification, screening, circulation control, production, bioengineering, and other forms of structural mitigation (1998, p. 550-1). Today, the designs of planting in and around the buildings are gaining importance in the architectural applications made in the cities that are concreted, and the number of alternative landscape designs such as green walls, green roofs, and sky gardens is increasing. Plants are preferred in urban environments for their functions, such as cleaning the air, keeping dust, acoustic comfort, and odour control, as well as their aesthetic value. Similarly, many plants have been planted for animal health in cities throughout history. For example, horse chestnut (*Aesculus hippocastanum*) was widely cultivated in İstanbul in the Ottoman Empire in the 16th century, as physician Willem Quackelbeen stated in a letter. During this period, horse chestnut was cultivated to relieve chest complaints of horses used in military power, and for cough and worm disease of sick horses (Lack, 2002, p. 15).

### 3. Medicinal Plant Gardens

#### 3.1. Medicinal Plant Gardens in the World

Before the development of synthetic chemistry, plants were known as the primary source of medicine. According to World Health Organisation (WHO 2002), many medicinal plants have been “used for healing around the world; in some regions, up to 80% of the population relies on plants as primary sources of medicine” (Cicka and Quave, 2019, p. 17). The use of plants for therapeutic purposes is as

old as human history. As Demirezer stated in 2010, "In the 5000s B.C., the use of plants for therapeutic purposes was encountered in the Mesopotamian civilisation, and it was determined that 250 herbal drugs were used" (Acibuca and Bostan Budak, 2018, p. 37). The knowledge of ancient civilisations about medicinal plants, the use of plants from the remaining inscriptions, and archaeological materials. It goes back to Sumer, Akkad, and Assyrians from 3000 B.C. according to the inscriptions and archaeological materials of this period. In a papyrus written in the Egyptian period in 1550 B.C., it was revealed that herbal and animal-based drugs were used in the treatment of diseases as a solution to about 450 diseases. Some of these include peppermint (*Mentha x piperita L.*), black mustard (*Sinapis nigra L.*), cassia (*Cassia acutifolia L.*), poppy (*Papaver somniferum L.*), sage onion (*Scilla maritima L.*), and tatula (*Datura stramonium L.*) are medicinal plants. In the Hittite period, plants such as mandrake, hawthorn, barley, wheat, saffron, and garlic were used as understood from the tablets of the same years (Kaya, 2011, p. 12). Many herbal preparations and formulas belonging to the Greek, Roman, and Byzantine periods were found, and during the Islamic Civilization period, physicians such as Al-Biruni, Ibn Sina (Avicenna), and Ibn al-Baytar mentioned medicinal plants, animal, and inorganic origin drugs. In Europe, new plants added after the discovery of America were used for medicinal purposes (Kaya, 2011, pp. 11-12).

According to WHO (2019, p. 8), traditional medicine is "total of the knowledge, skill and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness". Herbal medicines is:

herbs, herbal materials, herbal preparations and finished herbal products that contain, as active ingredients, parts of plants, other plant materials or combinations thereof. In some countries, herbal medicines may contain, by tradition, natural organic or inorganic active ingredients that are not of plant origin (e.g. animal and mineral materials) (WHO 2019, p. 8).

Using traditional medicine and herbal materials in medicine is increasing in the world. However, since agriculture in cities has decreased, the existence of plants in modern cities gains importance not only for cleaning the air and as a visual component but also for healing purposes. This approach mainly appears as a medicinal plant garden in green areas and gardens that appear in the city. In this sense, if handled with Steiner's anthroposophical approach, modern cities gain importance in re-establishing a holistic relationship between nature-human and living things in today's metropolitan and increasingly populated cities.

### 3.2. Built Environments and Integrative Approach: Zeytinburnu Medicinal Plants Garden

Medicinal plants have been very important in protecting the health of humans and other living things. Medicinal and aromatic plants are not only used as food and spice but are also used to make cosmetics, aromas and perfumes. Components such as phytochemicals isolated from plants are also used for versatile and different purposes such as food preservatives, colorants, sweeteners (Devkota and Watanabe, 2020, p. 44). As research from Willis states, it is known that about 30.000 of the 460.000 plant species known in the world are used for medicinal purposes (Devkota and Watanabe, 2020, p. 44). According to WHO (2005, p. 119), as many as 80% of the world's people depend on traditional medicine to meet their primary health care needs".

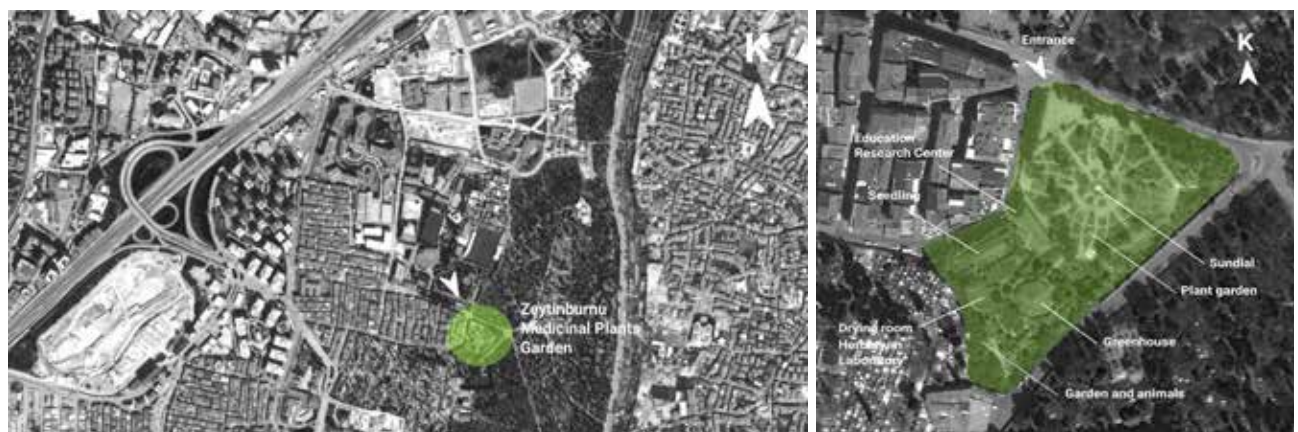
Throughout history, many buildings, and especially health buildings, have been designed and built with a holistic perspective, from architectural structure, land selection and location, building materials to interior spaces, landscape, and vegetation selection, and diversity in order to create livable and healthy environments. However, with modern urban planning, it is seen that the relationship of the plant with health is gradually disappearing in the city. Today, plant and landscape design and applications, except for certain health structures, are considered factors of secondary importance for people and all living things living in the city to gain health and healing properties. However, if we take it with Steiner's approach, it is a fact that plants have a very important role in the sustainability of urban life through their medicinal gardens.

Kösa and Güral (2019, p. 47) mention that medicinal aromatic gardens are not only established but also designed as a part of many parks and gardens. As Temel et al. stated (2018) “in the world, various medicinal and aromatic plants are cultivated on an area of approximately 36 million hectares, coffee, cocoa, tea, red pepper are in the first place in terms of production amount” (Kösa and Güral, 2019, p. 444). The size of the world’s medicinal and aromatic plant trade is gradually increasing. Important medicinal plant gardens in the world are Chelsea Physic Garden (1673), Camifolia Garden, Chemillé-en-Anjou (1976), Regional Science Center, Medicinal and Aromatic Plant Garden, Guwahati (1994), Indiana Medical History Museum-The Medicinal Plant Garden, Indianapolis (2003) (Kösa and Güral, 2019, pp. 47-48). The common feature of all gardens is that they offer recreational opportunities with their herbal designs and are educational for their users. Most of the gardens have labels identifying the plants. In the garden in Guwati, special arrangements have been made for the visually impaired as “Touch and Smell’ plants. Special paths with checkered tiles are provided in the garden, where visually impaired people can easily walk” (Kösa and Güral, 2019, pp. 47-48).

Medicinal plant gardens in Turkey are Nezahat Gökyiğit Botanical Garden, Istanbul, 320,000 m<sup>2</sup> (1995), Izmit Medical and Aromatic Plants Garden, 2000 m<sup>2</sup> (2016), Zeytinburnu Medicinal Plants Garden, Istanbul, 14.000 m<sup>2</sup> (2005), Lavender Fragrant Village, Isparta (5.000. 000

m<sup>2</sup>), Batı Akdeniz Agricultural Research Institute Medicinal and Aromatic Plants, Antalya (2010), Çukurova University Ali Nihat Gökyiğit Botanical Garden, Adana, 8500 m<sup>2</sup> (2014-2016). Examples in Turkey are organized for educational purposes for their visitors (Kösa and Güral, 2019, pp. 48-50). “Due to the climate and ecological characteristics of Turkey, many medicinal and aromatic plants can be grown or collected from nature as in many parts of the world. Laurel, mahleb, linden flower, sage, rosemary, liquorice root and juniper bark are collected from nature. Cumin, anise, thyme, fenugreek, fennel, mint and coriander are cultivated” (Bayram et. al, 2010, p. 8).

In this context, the first medicinal plant garden in Turkey is the Zeytinburnu Medicinal Plants Garden, implemented in 2005 in Istanbul, with contributions from Zeytinburnu Municipality and Merkezefendi Traditional Medicine Association. Established on 14 acres of land, the aim of implementing this park was to “study and cultivate the plants, ensure the growth and spread of new ones, to protect those under risk, to contribute to biodiversity, to encourage people to recognise medicinal plants and make them a part of the culture, and to train people on cultivation, and efficient and safe use of medicinal plants by benefiting from medical flora” (TR Dergisi and Dinçer (n.d.)). Besides, research on the production and promotion of the effective and safe use of medicinal plants, as well as conservation and development of plant diversity and educational programs, are held in the park (Figures 2, 3).



**Figure 2.** Left: Site plan showing the Zeytinburnu Medicinal Plants Garden; right: Plan and organisation of the garden (İstanbul Şehir Haritası, 2022)





**Figure 3.** Some of the plants in the park: *Cynara scolymus*: The leaves of the plant are used in the treatment (left), and *Fragaria vesca*: The leaves and fruits of the plant are used in the treatment (the second on the left) (photos by the authors, June 2022)

The area where the park is in a region with intense urbanisation in Istanbul. In the garden, there are over 700 medicinal plants processed through the QR code on some labels to promote the growth of medicinal plants (Zeytinburnu Tıbbi Bitkiler Bahçesi (n.d.)). These medicinal plants have endemic Anatolian species in the park (TR Dergisi and Dinçer, Murat. (n.d)). Plant wastes are used as natural fertilizers,

drip and sprinkler methods are used for irrigation. Synthetic fertilizers and pesticides are not used in the cultivation of plants (Zeytinburnu Tıbbi Bitkiler Bahçesi (n.d.)). Plants are collected when blooming, pressed, dried, glued to the cardboard, kept in the freezer, kept in the freezer, and stored in herbarium cabinets (Herbarium (n.d.)) (Figure 4).



**Figure 4.** Some of the buildings in the park: Drying room, Herbarium and Laboratory (left), Education research centre building (middle), and Greenhouse (right) (photos by the authors, June 2022)

In the garden, the following facilities exist: Tropical greenhouse and production greenhouse,

- Herbarium-Laboratory: a. Drying of plants, packaging and storage in drug refrigerators. b. Pressing and drying the plants collected in flowering form, sticking to files, freezing and labelling, c. Examining the morphology and anatomy in the laboratory, obtaining essential and carrier (fixed) oil,
- Sundial: daily and monthly movement of the sun; knowl-

edge of how animals, plants and air move during which week of the year,

- Animal shelter-Hives: Peacocks, pheasants, quails, ducks, geese, turkeys, roosters, chickens, rabbits, cats, turtles, pigeons
- There is a seed bank, laboratory, education and research centre and library (Figure 5).



**Figure 5.** Animals in the backyard garden: Hives and honey cultivation area (photographs by the authors, June 2022)

At the same time, in order to spread the medicinal plant culture, health environment school, home medicine, care, plants, foods, art, workshops with children aged 3-7, 8-12, internship opportunities, student support, volunteer gardening, documentaries as educational activities take place in the garden (Çekin, 2016, pp 134-135).

Zeytinburnu Medicinal Plants Garden is in an isolated area in the city and is surrounded by 1.6-1.8 meter-high walls (Figure 5). It is in an urban area of intensive construction and in a region with air pollution. The visit to the garden is carried out in a controlled manner and in this sense draws a relatively closed spatiality and territoriality. Although this spatial boundary is important for the protection of indoor plants, it reduces the visibility of the garden and nature (Figure 6).



**Figure 6.** Borders of the park and parking area at the entrance of the garden (photos by the authors, June 2022)

#### 4. Discussion and Conclusions

Steiner addressed “bio-cycles of natural life and the perception of light and colour as the revelation of universal mysteries of mind and soul...” (Sokolina, 2016, p. 52). His approach to life continues to be a source of inspiration for many designers today, with the increasing importance of nature and design philosophy. In his Goetheanum project, which is one of his important works, he emphasised the effect of colour and form and the positive effect of these ef-

fects on human memory while emphasising space. In the design philosophy where concepts such as the spirit of the place are discussed, Steiner mentions that what is put into Goetheanum is the soul of the people.

Today, the important issue in urban landscape design that has been going on for centuries and has not changed is that the existence of green areas has a healing effect on people. Many of the researchers who have studied and

continue to work on urban space, such as Claire Cooper Marcus and Naomi A. Sachs (2013), talk about the relationship of green areas with the surrounding structural areas in their studies. In terms of urban landscape ecology, the presence of soil, water, and plants are of great importance in terms of sustainable design management. At this point, the green areas allocated in built cities as an urban design component will increase the quality of life of the people around them. Medicinal plant gardens are areas that need to be taken into account with their recreation, education, and improvement functions as well as meeting the need for green space in cities.

The differentiation of the unique needs and possibilities of the society over the centuries is constantly changing the architecture. However, one of the forgotten issues is that human needs and preferences regarding nature and biophilia remain largely the same. For this reason, nature and design, which Steiner cared about in the 1920s, will gain more importance in different ways in the future and will be a source of inspiration for designers for centuries. One extension of these approaches is that the concept of biophilia and its applications are more important today than in the past. To find the possibilities of intrinsic and natural ways of seeing nature in our densely built environments, the healing properties of plants can remind us how to construct an intertwined form of continuity and flow between architecture, landscape architecture, and design practices. to live and exist in today's world.

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## Evaluation of Shopping Malls in Istanbul with Respect to the Sustainable Sites Initiative Criteria

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### Abstract

Severe interplays between the environmental dynamics and human beings provoke designers to search for new ways to handle the issue of sustainability. This study interrogates ways to evaluate landscape sustainability and focuses on certification systems. SITES appears as the certification system that this study considers as it comprehensively handles all scales of the landscape studies. Studying on the Shopping Malls of Istanbul Megacity, the projects are graded according to the nine major parameters as “site selection”, “pre-design assessment and planning”, “water”, “soil and vegetation”, “materials selection”, “human health and well-being”, “construction”, “operations and maintenance”, and “monitoring - innovation”. Benefitting from the background of the certification system, within this study, four different techniques developed, which are structured as weighted, unweighted, prerequisites regarded and disregarded. Through these techniques, six selected shopping malls are evaluated for their sustainability levels to generate an available platform to compare both the techniques’ credibility and the projects’ sustainability. Following the implementation of the techniques, 3 of the projects examine higher sustainability levels than the others. Results of the applied techniques represent that among all techniques, weighted ones are more successful due to the details they forward. In the case of Istanbul, shopping malls have problems with meeting some of the significant prerequisites. Therefore, using both the prerequisite regarded and disregarded weighted techniques is recommended to discover the prerequisite based failure levels and identify the properties to upgrade. This study scrutinizes the generation of a quick to implement a pre-evaluation tool. This tool is expected to be both for the benefit of new up to construct projects and the already constructed ones to upgrade the sustainability levels.

### Keywords

shopping malls; sustainable sites initiative; Istanbul; landscape planning, landscape sustainability

### 1. Introduction

Challenges of the 21st century bring about chaotic interplays between the environmental dynamics and human beings, which provoke designers to search for new ways to handle the issue of sustainability. With their specific concern on limited energy consumption, limited water usage and waste production, sustainable studies have got minor impacts on the territory than the common design, construction and management studies (Yates and Castro-Lacouture, 2018). Thus, regarding its specific concern on ecology, the profession of landscape

architecture inevitably has to play an active role in the studies on sustainability to avert environmental problems.

According to Calkins (2008), Gauzin-Müller & Favet, (2002) and Venhaus (2012), sustainable landscape design has got several benefits, including environmental benefits, such as improving and protecting natural resources together with biodiversity and ecosystems, providing waste management, and enhancing air-water quality. Besides the environmental benefits, economic and social ones are also specific. Reducing operating costs, increasing user

productivity, land value, and profit appear as the economic benefits, while increasing the employee participation, the health, and comfort of users, reducing the burden on local infrastructure, and improving the quality of life come up as the social benefits.

On the sustainability of landscape areas; research and selection of suitable land and water resources, productivity studies, standards-setting, preparation and development of master plans for land use including drainage, irrigation, planting are essential to consider aesthetic concerns as well as to keep functionality in mind while performing these studies (Rogers, 2010) Sustainable landscape architecture creates ecological designs in a multi-scale fiction ranging from urban to rural, from open spaces to semi-open and even closed spaces, holding function, budget, energy efficiency, aesthetic, and environment-oriented systems as a whole. Agglomeration of the quantitative evaluations towards these issues inevitably brings about the possibility of using certification systems.

This study interrogates the role of certification systems within the sustainability studies. Thus, it attempts to benefit from them to criticize the current projects then debug them for the sustainability of future studies. Today, there are many global certification systems developed in different countries. However, some of the most widely used and well-known certification systems are BREEAM, LEED, Green Star, and CASBEE, which are accepted by the many member countries of the World Green Building Council. Besides these, the SBTool certification system is used in various countries as it is adaptable to national conditions. However, among all these certification systems above-mentioned, the Sustainable Sites Initiative (SSI) supported system stands as a significant one by its emphasis on landscape sustainability.

This certification system was established in 2005 as a result of the studies conducted together with the American Society of Landscape Architects, Lady Bird Johnson Wildflower Center, University of Texas, and United States Botanic Garden. SSI aims to obtain sustainable conservation and amelioration of green areas by considering the issues of design, construction, and management (VanDerZanden and Cook, 2010).

Over the years, as expectations and needs change, certificate systems also update and develop themselves. Following the consideration of several systems, this study interrogates SITES as a set of guidelines and a rating system that can be applied to the varying type of areas with or without buildings. When we regard the interplay between the demand and supply approaches, this selected certification system is the one that stands on ecosystem services.

According to SITES v2 (2014: vi), “The central message of the SITES program is that any project—whether the site of a university campus, large subdivision, shopping mall, park, commercial center, or even a home—holds the potential to protect, improve, and regenerate the benefits and services provided by healthy ecosystems”.

TEEB (2010) defines the ecosystem services as the direct and specifically the indirect contributions of ecosystems to human well-being. Regarding the benefits people acquire from ecosystems, MA (2005) identifies four types of ecosystem services. “These include provisioning services such as food, water, timber, and fiber; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling” (MA, 2005: v).

Such an ecosystem services oriented approach brings about vibrant parameters for the establishment of sustainability, including some prerequisites and credits under nine main topics as “Site Selection”, “Pre-Design Assessment and Planning”, “Site Design – Water”, “Site Design- Soil and Vegetation”, “Site Design – Materials Selection”, “Site Design – Human Health and Well-Being”, “Construction”, “Operations and Maintenance”, “Monitoring and Innovation” (SITES v2, 2014; Sustainable Sites Initiative, 2009).

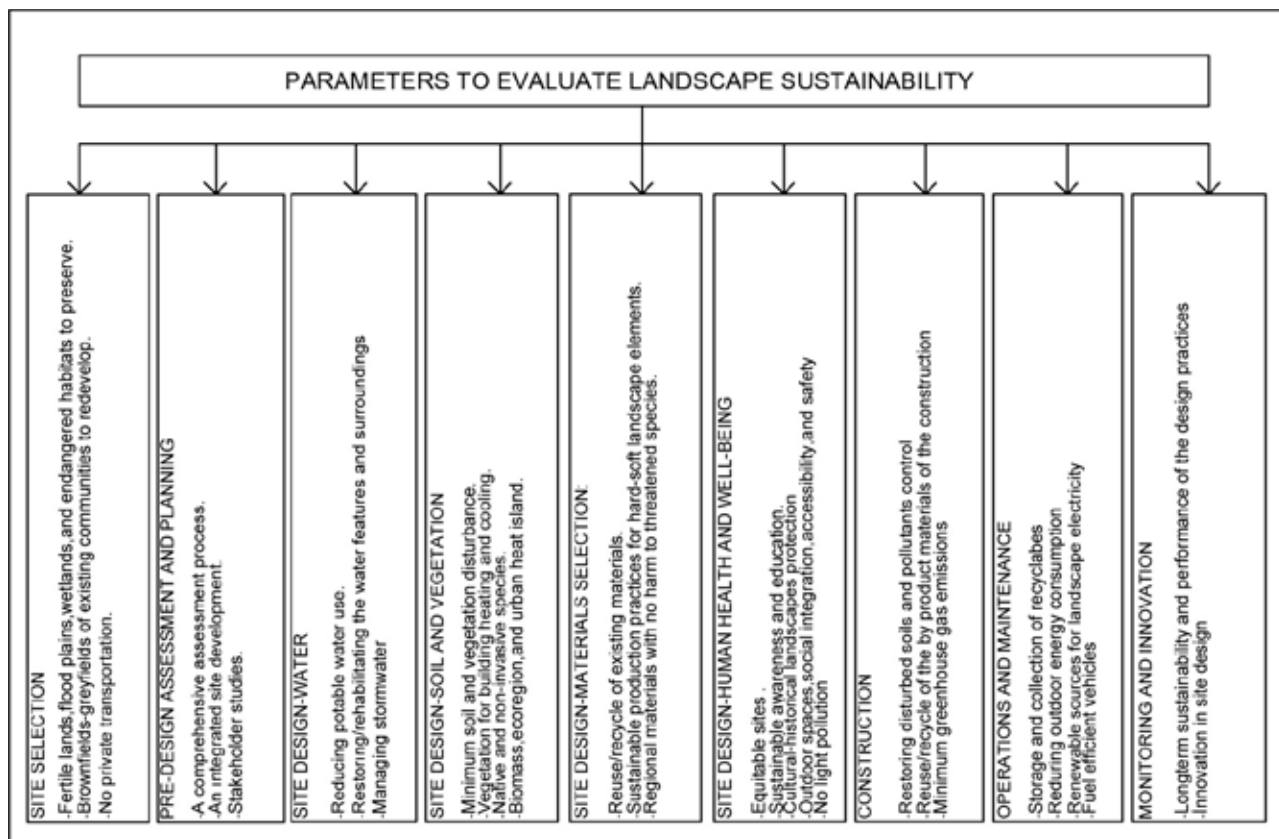
Figure 1 shows/ represents the parameters to evaluate landscape sustainability and forwards summaries pertinent to them. Although this information is produced or compiled from the principles of Sustainable Sites Initiatives, it is representing the general base for the sustainability

assessment tools.

Among all parameters, site selection stands as the first major parameter and is directly related to the principle of “do no harm” and concentrates on the protection of the ecosystems by regarding a risk-sensitive approach toward the habitat degradation and environmental disasters. Therefore, it also discourages explicitly the usages of greenfields, sites away from the existing built-up spaces and sites depending on motorized transportation (MA, 2005; SITES v2, 2014; Sustainable Sites Initiative, 2009; UNDESA, 2022).

Parameter of “pre-design assessment and planning” comes before the site design process and involves exhaustive assessments on-site conditions to support decision makings that will be conducted by a multidisciplinary team in collaboration with the stakeholders (Sustainable Sites Initiative, 2009).

The site design process is composed of 4 sub-processes involving “water”, “soil and vegetation”, “materials selection”, and “human health and well-being”, correspondingly. Minimizing the usage of potable water for landscape irrigation by varying percentages is essential for protecting the natural water units with their surrounding ecosystems. Therefore precautions and interventions are credible not only to protect/conservate but also to rehabilitate these water-based features together with the proposals of management them even at the stormwater level. Alternative irrigation methods and conservation strategies for water-dominant landscapes bring about some key study subjects such as “riparian, wetland, and shoreline buffers”, “flood and erosion controls”, “geomorphological and vegetative methods”, “stormwater and pollutants management”, and “landscape amenity” (Li et.al, 2019; Prudencio & Null, 2018; SITES v2, 2014; Sustainable Sites Initiative, 2009; UNDESA, 2022)



**Figure 1.** Primary parameters with their summarized contexts ranging from the site selection phase of the project to the last one as monitoring and innovation (Sustainable Sites Initiative, 2009).

Site design- soil and vegetation parameter embodies both the preservation and restoration issues related to “usage of non-invasive plants appropriate to site conditions”, “plant communities native to the ecoregion”, “plant biomass”, and “minimizing both the building scale energy consumption and urban scale heat island”. Vegetation component of a landscape is inseparable from the other components of its ecosystem but the soil layer. Thus, the preparation of a soil management plan to minimize the impacts of the project on land is the starting point of all the preservation and restoration issues. A multiscale approach is inevitable for the management and evaluation of eco-sensitive spatial studies as it is noticeable from the so far mentioned principles about the sustainability assessment (Calkins, 2012; SITES v2, 2014; Sustainable Sites Initiative, 2009; UNDESA, 2022).

Site Design materials selection starts with searching for the possibilities to benefit from the reuse and recycle potentials of the on-site structures. It is acutely recommended to use certified regional materials with no harmful effects both to human health and the threatened species. Thus, it brings about support to environmentally friendly practices in materials manufacturing (Calkins, 2008; SITES v2, 2014; Sustainable Sites Initiative, 2009; UNDESA, 2022).

Parameter of site design- human health and well-being regards the social, cultural, and economic impacts of the project, which makes it strategically significant within the whole sustainability assessment process. With its concern on even cognitive and human-scale issues, it focuses on providing the fair site usage, protection of the historical and cultural components of the landscape character, awareness and education on sustainability, safe access, social integration through design (Rogers et al., 2012; SITES v2, 2014; Sustainable Sites Initiative, 2009; UNDESA, 2022).

Construction is expected to be successful at restoring disturbed soils to benefit from them in the following processes, together with conducting comprehensive control on pollutants, even the air pollutants and greenhouse gas emissions. Byproducts are carrying reuse/recycle potentials, which should not be disregarded. Following the construction, long-term studies take place

(Calkins, 2008; SITES v2, 2014; Sustainable Sites Initiative, 2009; UNDESA, 2022).

Long-term strategies and short-term actions to achieve sustainable operations and maintenance mainly focus on benefiting from recyclables, reducing outdoor energy consumption and emissions while benefiting renewable sources for landscape electricity. Long term monitoring generates an improvement in knowledge and performance evaluation over time, which enables innovation in site design (Calkins, 2012; Deeb et al. 2020; UNDESA, 2022; SITES v2, 2014; Sustainable Sites Initiative, 2009).

Considering the sustainability performances of our living environments, this study interrogates the stance of the public spaces in the form of shopping malls towards the sustainability goals. Paköz, Sözer, & Doğan (2021) define public spaces as the heart of the cities due to their being one of the major indicators of the urban image. Besides, social sharing usually occurs in these public spaces. Thus, public space has a critical importance for the city and society as it generates a sense of community.

In the digital era, the privatization of public spaces has become the focus of the discussions. Langstraat & Van Melik (2013) define a pseudo-public space as any space that is owned and managed by enterprises with a profit in mind. Therefore, shopping malls are the most common examples of pseudo-public spaces with their increasing numbers. Since the quality of urban life can be evaluated from the quality of public spaces, planning and design of these pseudo-public spaces are vital both in the agenda of urban planning and landscape sustainability.

Today, it is still hard to handle the issue of evaluating the level of landscape sustainability apart from the comprehensive and multifaceted processes. Thus, revealing the sustainability capacities of the projects deserves to study on in order to highlight the necessity to develop more tools to benefit from them through the evaluation processes.

## 2. Materials and Method

This study interrogates ways to evaluate sustainability. Thus, it focuses on certification systems. As the one that is comprehensively handling all scales of the

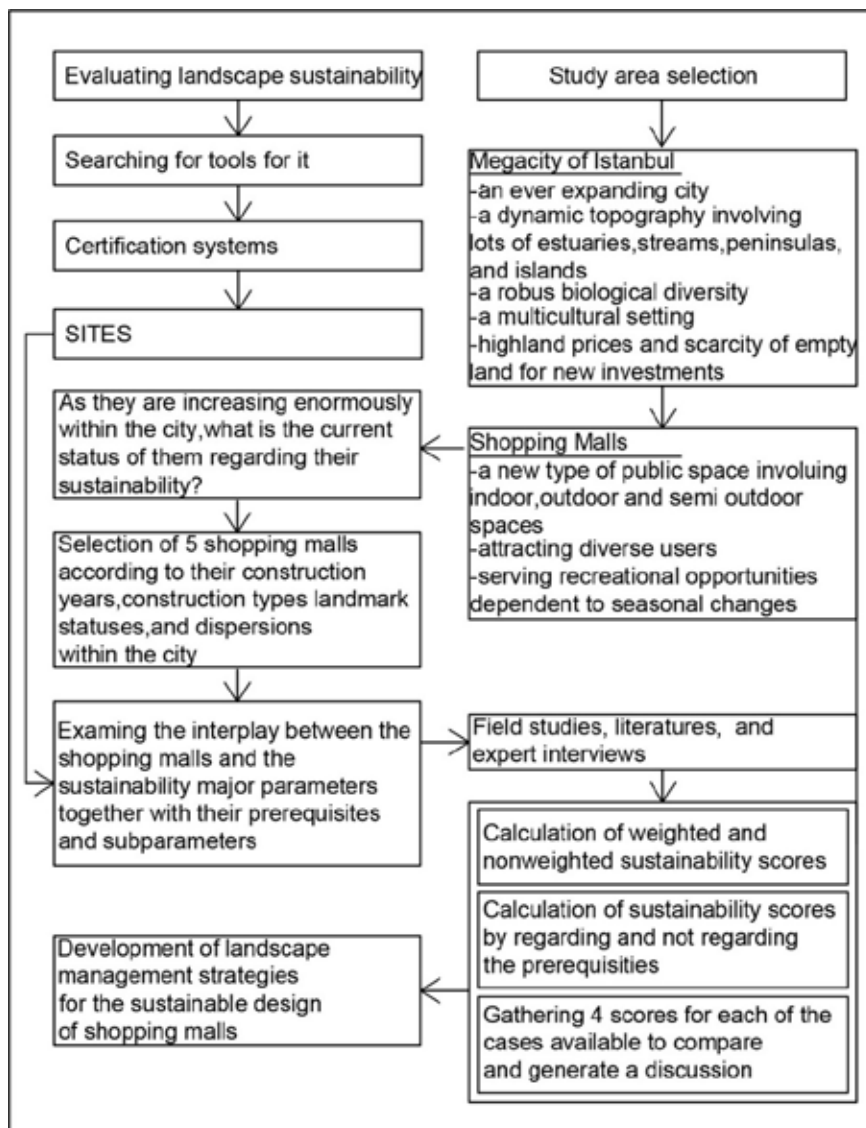
landscape studies, SITES appears as the certification system that this study considers. Besides the selection of it, another one is the identification of the study areas.

Significant with its chaotic dynamics, the megacity of Istanbul is a perfect coarse-scale study area. It is an ever-expanding coastal megacity that has got a dynamic topography, bringing about lots of streams, estuaries, peninsulas, and islands. Thus, the city is vibrant about its biodiversity and landscape character areas, which requires multiscale water management under the adverse impact of the expanding built-up spaces (Turer Baskaya, 2018).

Transformed into most preferred gathering public places

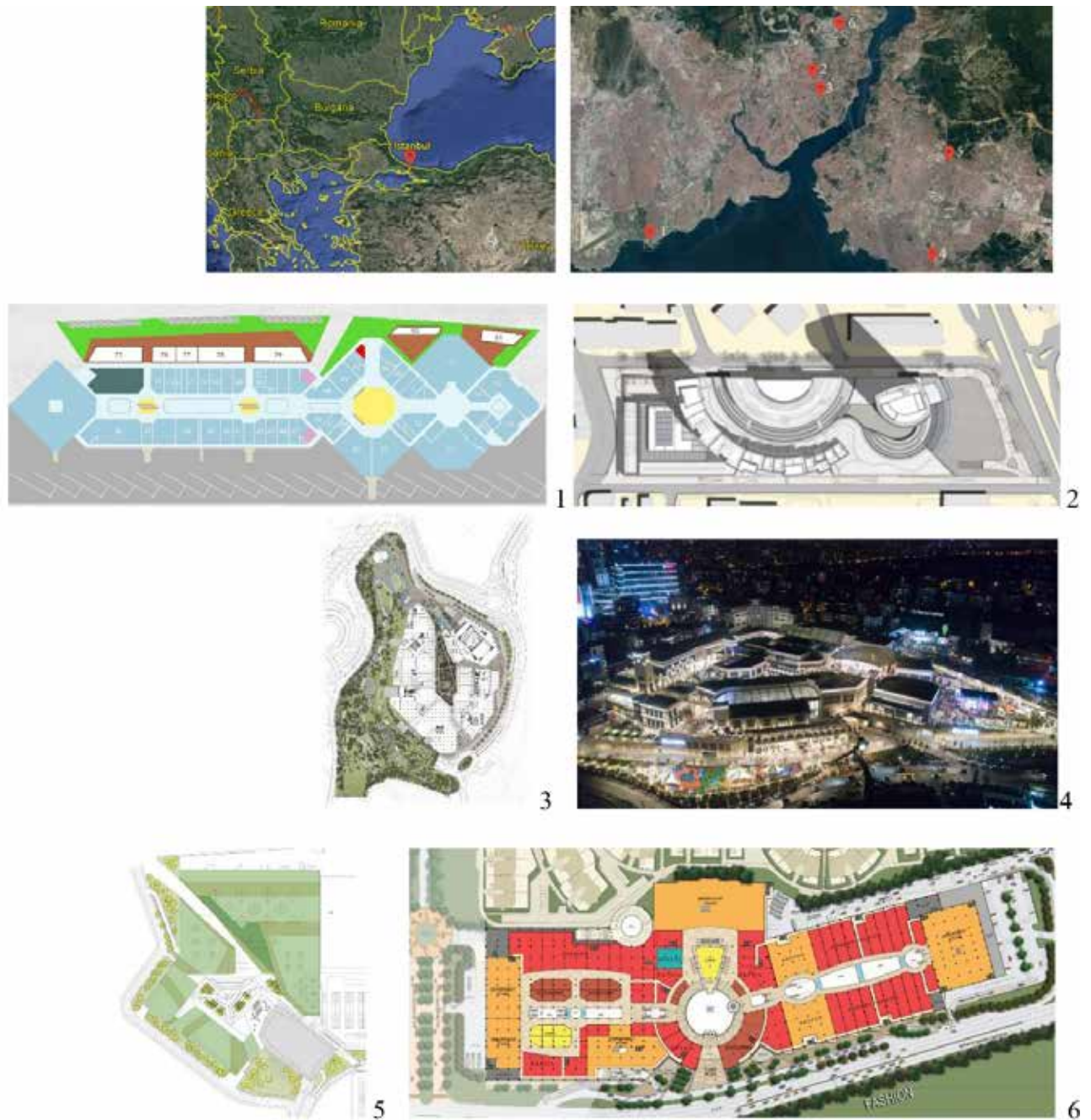
by the citizens of Istanbul, number of shopping malls is enormous in Istanbul. According to Emlak Kulisi (2015), as the first half of 2019, there are 121 shopping centers in Istanbul, and planning studies represent that there will be 11 new shopping centers by the end of 2021. Regarding this increase, it is getting more important to understand their current level of sustainability. Only in this way is it possible to develop landscape management strategies that will enable sustainability to be improved.

This study investigates the identified sustainability rating system on selected Shopping Mall Landscapes in Istanbul. Figure 2 represents the phases of the evaluation process conducted within this study.



**Figure 2.** Phases of this study (developed by authors).





**Figure 3.** The locations and bird views of the study areas in Istanbul, Turkey (Galleria, 2018; Merdim, 2013; Itez, 2013; Archdaily, 2019; BACnet, 2018; DDG, 2019)



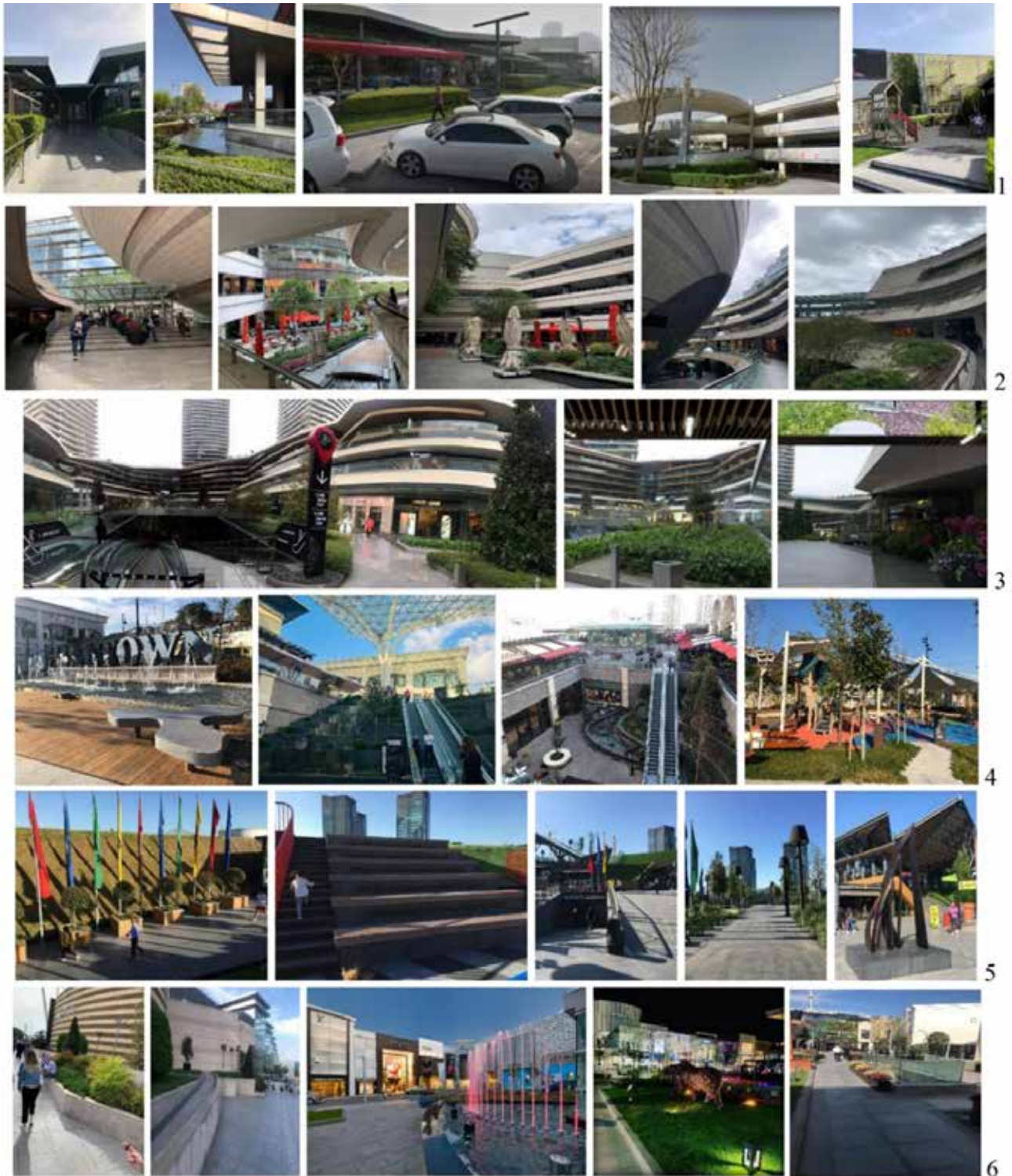


Figure 4. The study areas and the related human-scale images (photographs by authors).

Six shopping malls are selected according to their construction years, construction types, design concepts, landmark statuses, and dispersions within the city. In figures 3 and 4, the layout plans and site photographs of

these malls are available. However, due to the commercial statuses, they have got, the names of the case studies are not going to be mentioned through this study.

**Table 1.** General comparison of the case studies according to their basic characteristics (improved by authors)

	1	2	3	4	5	6
<b>Location</b>	40.97°N, 28.87°E	41.08°N, 29.01°E	41.07°N, 29.02°E	40.95°N, 29.12°E	41.02°N, 29.13°E	
<b>Project Category</b>	AVM	AVM	AVM	AVM	AVM	AVM
<b>Opened</b>	1988	2006	2013	2017	2007	2007
<b>Project Size (m<sup>2</sup>)</b>						
<b>Total Area</b>	120.000	250.000	620.000	63.000	80.000	276.000
<b>Landscape Area</b>	36.000		108.200			
<b>Project Type</b>	Shopping Mall	Shopping Mall	Shopping Mall	Shopping Mall	Shopping Mall	
<b>Certificate</b>	-	Breem Very Good- 2012	-	Leed Gold-2018	-	-
<b>Access Proximity to Public Transport</b>	+	+	+	+	+	+
<b>Car Park (vehicle capacity)</b>	+	+	+	+	+	+
<b>Major Activity Areas</b>	Playgrounds, water features, ramp entrance, grass fields	Green roof, planting on roads, sunshades at the southern facades	Green roof, recreation area, swimming pool, kids club	3 squares, playground	Playgrounds, fountains, seating groups, amphitheatre, squares, sculptures	
<b>Sustainability properties</b>	Not any evident work	Energy use, Water	Not available data	Landscaping with low water	Natural ventilation, natural lighting, solar control, green roofs and geothermal energy use	Not any evident work

Case study number 1, which opened in 1988, is the first shopping mall in Turkey. Regarding its locational advantages, together with the educational and income levels of the surrounding citizens, it addresses the classes A, B+, and B according to the international standards. Due to these attributes, this mall is inevitably involved in the evaluation process to represent the time period it constructed.

Study area 2, 5, and 6 are constructed at similar years. The shopping center 2 is located in the city center and recognized with its green roofs and vertical gardens together with the energy efficient approach. The shopping mall 5 handles a concept of “development of a city square together with its surroundings” and stands as a significant open air activity center. The shopping mall 6 stands significant among the shopping malls in Istanbul due to its size and store composition. Its most significant features are a glass dome and the interfaces between the open and built spaces.

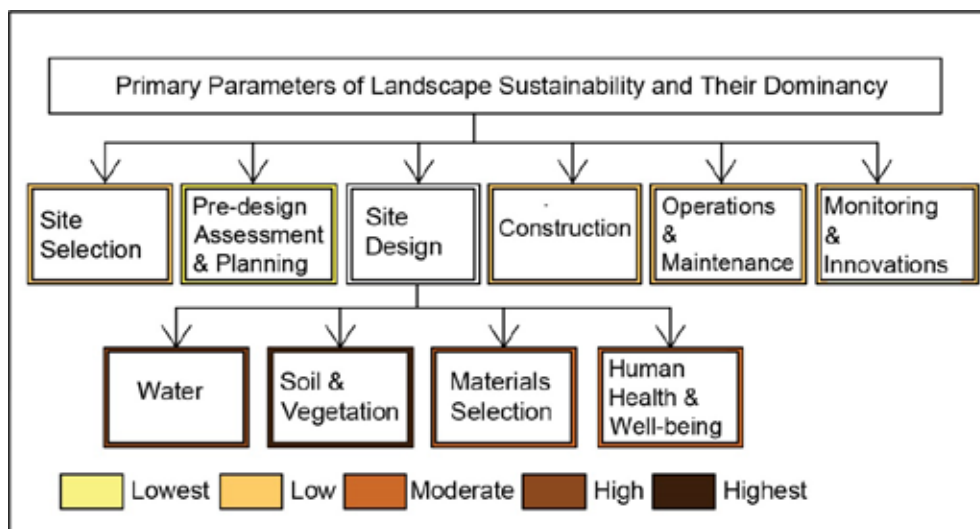
With its 2013 construction year, the shopping mall 3 involves a massive area. It is a mixed-use project that includes the areas for hotel, residence, shopping, and cultural land uses together with the business centers. Finally, 2017 dated the 4th shopping mall is advertised as the one existing in the new generation shopping mall category. Its design concepts forward opportunities to the users to benefit from the semi-open restaurants, commercial streets, and public open spaces open to sea panoramas.

The number of certifications and awards that they have gathered appeared as another important determinant. Two of them have got certifications on sustainability while the other four have got no certification. Table 1 represents the basic characteristics of the case studies.

Through field studies, literature readings, and expert interviews, data are gathered about the selected sites to start the performance calculations. Interviews and field studies are conducted through the time period in between September to December of 2018. Expert interviews conducted with the administrative team members of the shopping malls together with the park and county officials.

It is striking to observe that for such megastructures in a megacity like Istanbul; there are no or limited available data about their sustainability, which should have been highly accessible. A process of revealing the sustainability capacities begins with the identifications of the parameters.

Landscape sustainability parameters based on the logic of SITES initiatives exist of nine primary parameters, as described in the introduction section with the summary of their subparameters. The subparameters’ and thus, the primary parameters’ power within the evaluation system are not the same. They stand as the components of a multicriteria analyze. The number and credits of the subparameters vary according to the declared evaluation system.



**Figure 5.** Weights of the primary parameters (improved by authors).

Method of this study stands on the interrogation of the role of these weights. This study develops four types of evaluation techniques, while the first two evaluation techniques concern the weighted calculations. At the original evaluation process of SITES, each primary parameter involves some prerequisites without any credits and several subparameters with varying credits. The difference among the credits depends on the importance of the parameter at the foundation of landscape sustainability. Thus in order to generate a basic, easy to apply way of sustainability evaluation, this study handles the total credit of a primary parameter and calculates the arithmetic mean by considering the number of its subunits. As the weights of the primary parameters range from four to 51 points, this technique reveals weight differences among the primary parameters, which are represented in figure 5.

As this study develops two weighted methods, the first one benefits from the prerequisites, while the other one disregards the prerequisites through their evaluation processes. Thus, when the properties of a case study can not meet the prerequisites of a major parameter, the

case study gets eliminated from the evaluation procedures pertinent to that parameter and its subparameters. The last two techniques handle a similar approach but through an unweighted way. Thus, they consider the number of subparameters and record if they are merely met or not. The process of regarding and disregarding the prerequisites work similarly to the weighted calculation systems mentioned above.

### 3. Results and Discussion

To interrogate the validity of the techniques developed within this study, several spreadsheets are generated. These spreadsheets enabled us to make comparisons about the techniques, thus revealed the most convenient one to stand as a basic assessment tool to discover the level of landscape sustainability. Table 2 illustrates one of these spreadsheets, which involves the results of the unweighted technique disregarding the prerequisites. This spreadsheet is selected to represent as it is the plainest one to express the method of the study and compare the sustainability of case studies.

**Table 2.** A sample from the spreadsheets – an unweighted and prerequisites disregarded one generated through the study (developed by the authors)

Major Parameters	SHOPPING MALLS					
	1	2	3	4	5	6
1. Site Selection	Pr 4/4	Pr 3/4	Pr 2/4	Pr 4/4	Pr 4/4	Pr 2/4
	1/3	3/3	2/3	3/3	2/3	2/3
2. Pre-Design	Pr 1/2	Pr 2/2	Pr 2/2	Pr 2/2	Pr 2/2	Pr 2/2
	0/1	1/1	1/1	0/1	1/1	1/1
3. Site Design Water	Pr 0/1	Pr 1/1	Pr 1/1	Pr 1/1	Pr 0/1	Pr 0/1
	4/7	5/7	2/7	2/7	2/7	1/7
4. Site Design Soil & Vegetation	Pr 3/3	Pr 3/3	Pr 2/3	Pr 2/3	Pr 2/3	Pr 3/3
	3/10	4/10	7/10	3/10	8/10	2/10
5. Site Design Materials Selection	Pr 0/1	Pr 1/1	Pr 1/1	Pr 1/1	Pr 1/1	Pr 1/1
	2/9	7/9	9/9	5/9	8/9	7/9
6. Human Health & Well-Being	Pr 0/0	Pr 0/0	Pr 0/0	Pr 0/0	Pr 0/0	Pr 0/0
	4/9	7/9	7/9	7/9	8/9	7/9
7. Construction	Pr 1/2	Pr 1/2	Pr 2/2	Pr 1/2	Pr 2/2	Pr 1/2
	0/4	2/4	3/4	1/4	4/4	2/4
8. Operations & Maintenance	Pr 2/2	Pr 2/2	Pr 2/2	Pr 2/2	Pr 2/2	Pr 1/2
	1/6	5/6	6/6	1/6	4/6	1/6
9. Monitoring	Pr 0/0	Pr 0/0	Pr 0/0	Pr 0/0	Pr 0/0	Pr 0/0
	0/2	2/2	2/2	1/2	2/2	0/2
<b>Total</b>	Pr 11/15	Pr 13/15	Pr 12/15	Pr 13/15	Pr 13/15	Pr 9/15
	15/51	36/51	39/51	23/51	39/51	23/51

Pr x/y

Pr: Prerequisites

X: Number of met prerequisites

y: Total prerequisites

c/z

c: Number of met subparameters

z: Total number of subparameters



Examining the landscape sustainability of 6 shopping malls by benefiting from 4 different evaluation techniques forwards several advantages such as;

- Comparing the case studies according to their landscape sustainability,
- Identification of the most reliable and easy to implement technique,
- Interrogation of the most successful and unsuccessful case studies through their design and planning features,
- Identify the weaknesses and strengths of shopping centers throughout Istanbul.

One of the evaluation techniques used in this study is the one concerning the weighted calculations and disregarding the prerequisites. Through this technique, the overall success of these six shopping malls highlights that they are specifically successful at 5 of the major parameters, which are "human health and well-being," "site selection," "site design- materials selection," "pre-design," "monitoring" over 50% success.

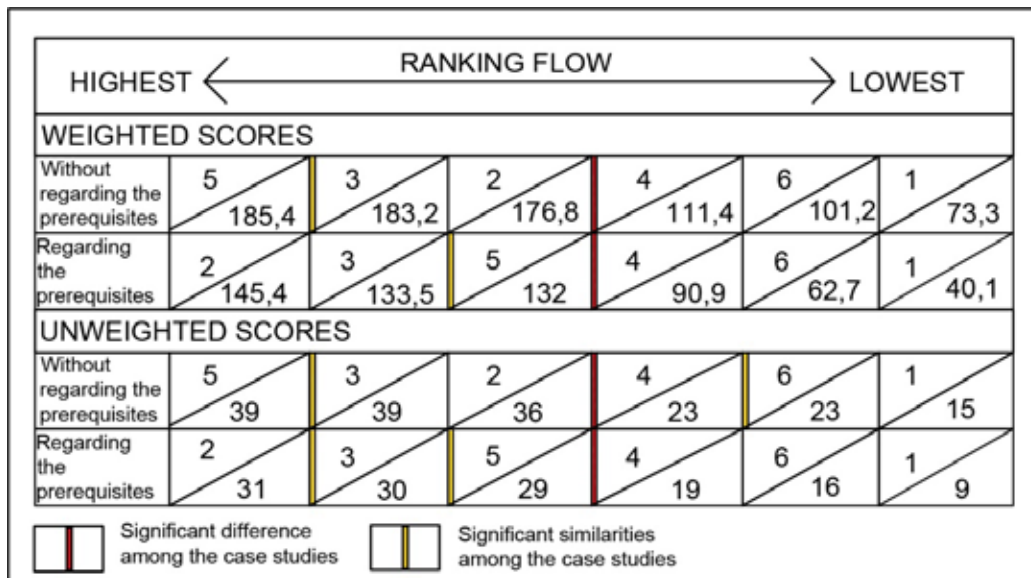
In order to understand the efficiency of the prerequisites, at the second technique, prerequisites are regarded; thus, the shopping malls which cannot provide the prerequisites of a major parameter are excluded from the evaluation process of that corresponding parameter.

In case of failure to meet the prerequisites, the most significant parameters appear to be "human health

and well-being," "site design- materials selection," and "monitoring," respectively. These are the only ones that examine success over 50%. Drastic failures are observed at all of the parameters except two of them involving no prerequisites, which are "human health and well-being," and "monitoring." Although the "site design-materials selection" parameter stood above the 50% success, its success failed from 83.3 to 66.7.

These alterations prove the impacts of the prerequisites on the validity of the landscape sustainabilities of the case studies. In the case of Istanbul, this study shows that sample sites represent weaknesses at the prerequisites of the major parameters they are successful. This issue brings about an unsteady design sphere for the overall case studies.

Another meaningful discourse from the comparison of the weighted and unweighted techniques is that although they do have a no dominant changing impact on the success order of the case studies, they affect the intervals. Unweighted evaluations come up with very narrow intervals, which are bringing about comparisons vulnerable to errors. Weighted comparisons care for the numbers of the subparameters with their importance levels. Thus, they handle an evaluation as a fundamental multicriteria analysis quick to conduct. The clarity of the intervals eliminates the error probability. Therefore the weighted system stands as the recommended technique.



**Figure 6.** Sustainability scores of the case studies together with their ranks and significant interplays (improved by authors).

As this study aims to interrogate the generation of a quick to implement pre-evaluation tool, this tool is expected to be both for the benefit of new up to construct ones and the already constructed ones to upgrade their sustainability levels. Thus if the evaluation system just depends on the weighted and prerequisites regarded one, in case they can not meet the prerequisites, the case studies encounter an obstacle to test their all properties in the way of sustainability. They need to see both the prerequisite regarded and disregarded one, to understand their failure levels and identify the properties they need to upgrade. Benefiting from two of the techniques will motivate them to heal their vulnerabilities.

Weights of the primary parameters, as they are represented in figure 5 above, appear to be another essential issue within the evaluation process. Site design- water and site design- soil and vegetation, which are the dominant weighted parameters, are decisive in the success orders of the case studies, as illustrated in figure 3. The shopping malls stand at the three highest ranks are the ones that are more or less successful on these parameters. Shopping Mall 1, which received the lowest rank, is the first shopping mall of Istanbul and examines the disadvantage of its construction techniques and design approaches of those periods. However, even from the parameters of “monitoring” and “operations and maintenance,” which represent the intention to upgrade the current status, it has got minimum credits. The subparameters it fails reveals the insufficient purpose on the way to sustainability development. Another interesting result comes related to the 4th shopping mall, which is not standing in between the successful malls but owning an international certification on sustainability. This result brings about questioning the correlation between the certification systems, thus may act as a step for further studies.

#### 4. Conclusions

Increasing environmental issues require the concern of planning and design disciplines to generate sustainability strategies, techniques, and tools to mitigate these problems. This study regards the quality of the landscape with an ecosystem service sensitive approach. Revealing the quality and, thus, the sustainability capacities of the projects is significant for both the almost completed

projects to upgrade them and the oncoming ones to be initially arranged sustainably. Certification systems stand as an essential tool for the evaluation of sustainability. Thus, this study attempts to generate a pre-evaluation tool to identify the level of landscape sustainability of the projects with a hope that the findings of this study will be a step for further studies for the benefit of landscape sustainability establishment.

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## An Assessment of the Design Criteria of Market Areas in Terms Of Urban Space Quality

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### Abstract

This study was conducted to determine how the public markets that serve as open urban areas fit themselves among the other functions in the city and how the design criteria could be shaped in a good organized city. In the study, urban space quality was analyzed over Yeşilköy market (İstanbul), Kemberburgaz Bol Pazar market (İstanbul) and the Braga Market (Portugal) in terms of design criteria. These evaluations were applied by revealing the urban space quality criteria through literature research. In addition, design parameters were created based on site selection, circulation, street furniture (lighting, landscape and signing) determined for open market places through design guidelines and existing examples. On-site field work for the examples in İstanbul was carried out. Three different examples discussed in the study were analyzed over the design parameters. The location selection, that is among the design criteria of the market areas, is to some extent important for users to use these areas, but it is not the only indicator on its own. Today's modern market areas are not only for selling fruits and vegetables, they are created using good design elements and equipped with versatile activities and social areas.

### Keywords

open markets; public area; urban space quality; market area; design criteria

### 1. Introduction

The development of "public spaces" has been an important element of the social, economic, and political development of cities. Especially the open public spaces (squares, parks, market places, etc.) have not only served as hubs of economic mobility but also as centers with highly active social interaction. Although public spaces, including open market places, have gradually lost their dominant character in urban life from the Middle Ages to the present day as a result of the rise of capitalism, they continue serving as an effectively used urban focal point. The public term semantically suggests the non-private, something that concerns all or accessible by all.

The open and semi-open market places are preferred in Turkey because they offer more affordable and cost-effective products compared to the shopping malls, while those

places rather provide a 'boutique' service in Europe in conceptual terms. The European market places are structured with a more accentuated focus on tourism, aimed to promote and sell traditional products and keep the past alive. The marketplaces for special occasions, including festivals or Christmas, not only to appeal to local users, but act as a center of attraction for all the visitors from around the world. As regards the permanent open markets, the frequent practice in certain countries, including Spain and Italy, is to convert previously non-functional old buildings to serve as a permanent marketplace. Furthermore, due to the COVID-19 outbreak in the later 2019, both the importance of open public spaces and especially the open/semi-open markets remarkably increased with regard to design and that the latter have been considered safer and thus favorable compared to the confined spaces.

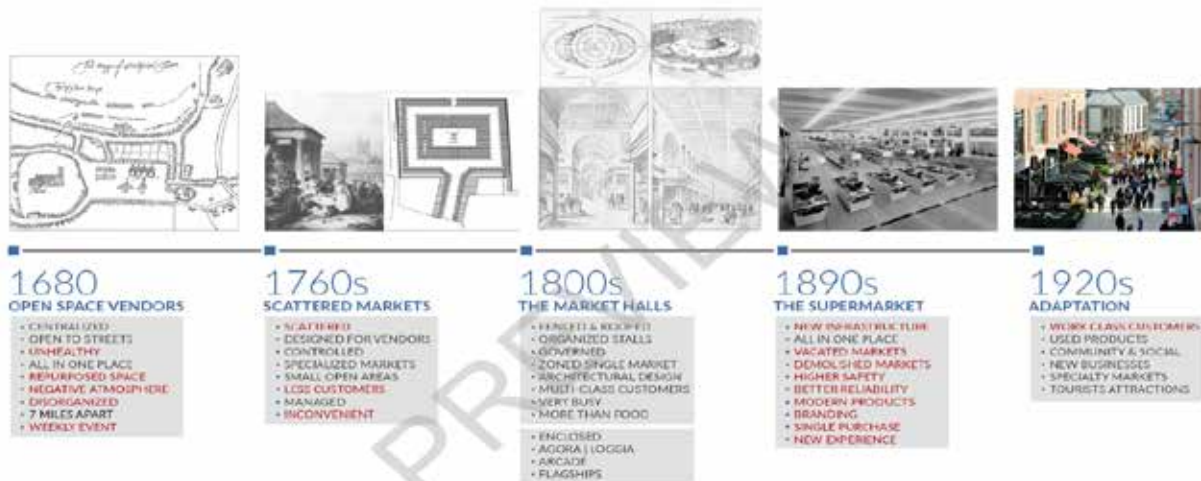


fig 2.06 | Public markets in the United Kingdom through time. Each period defines a shift in the design due to different drivers pushing public markets to reiterate and change.

**Figure 1.** Historical development of marketplaces (Al-Shidhani, 2021)

Vural and Yücel (2006) referred to the “public space” term as urban or rural areas that were accessible by people in their studies, namely “A critical look at shopping malls, the new public spaces of our time”.. From the pre-Roman period, until the mid-20th Century, the food and beverage-oriented market places and wine shops, and land uses associated with dining spaces served an urban function in the center of the neighborhoods. These spaces were used for celebration days, administrative events, rituals, and other public ceremonies (Parham, 2005).

Required standards intended for the marketplaces were set during the development of the zoning plans for the market places. Accordingly, the market places should be designed large enough to accommodate a minimum of 2.500 people with a maximum distance to the market of 1.5 km and a minimum service area of 700 hectares. In terms of size, the marketplaces must be established on a minimum of 4.000 to 6.000 square meters (Aksoy, 2009).

Public space consists of open or semi-open areas, including streets and alleys, squares, parks, markets, and closed spaces, including religious buildings, museums, hospitals, and schools that are outside the private areas and accessible by everyone (Cordan Çolak, 2015).

### 1.1. The Aim of The Study

Urban spaces serve not only to their intended function in the society, but also provide social facilities that bring people together at their location. The main purpose of the present study was to investigate how market places as urban open or semi-open spaces had a place among the other functions in the city and how the quality of space was shaped by means of design criteria in a well-organized city. Accordingly, it was aimed to investigate the quality of urban space in the context of marketplace design parameters. It is observed that the permanent markets are not used actively and effectively in Turkey. How the quality of space was shaped in the market areas was investigated upon a comparison between exemplary cities that actively used market places as an urban function in daily neighborhood life and examples from Istanbul.

### 1.2. Context of the study

The Yeşilköy Market in Bakırköy, Istanbul and BolPazar in Kemerburgaz and the Braga Market, which received design award, were considered sample areas within the scope of the research. The Yeşilköy Market was chosen because it was accessible to everyone in Istanbul and appealed to the middle-income group in terms of social structure. BolPazar was included in the research on the

grounds that it appealed to a higher income group and was designed for luxury consumption rather than the need for the region as a general design criterion. A comparison of these two different samples from the same city provided significant input for the purposes of the study. Furthermore, selection of another example from abroad allowed a comparison of the marketplace design criteria in place in different countries. The Braga Market was selected due to the fact that it was good example among of semi-open marketplaces; as a matter of fact, the market received the Loop Design award in 2021.

## 2. Methodology

First, a literature review on public market places and their development was performed pursuant to the methodological approach of the present study. Sample areas were selected and field studies were conducted upon the literature review with an aim to define the design criteria. The examples from Turkey were investigated in situ by means of field studies. The attributes, including transportation, lighting and signing, and interior design that would affect the design parameters were captured by photography. The existent characteristics of the sample areas were investigated within the scope of the design parameters, which were determined during the literature review stage.

Within the scope of this research, three examples, two from the same city and one from abroad, were investigated in the context of urban space quality with a view to the design criteria of open markets. The confined and permanent marketplaces were excluded from the scope of the study and the research was limited to open and semi-open market areas in consideration of the fact that the foregoing marketplaces would have differences in design criteria terms.

### 2.1 The problem of the study

A comparison with the public open market spaces in developed countries indicated that the examples from Turkey were located in arbitrary unoccupied spaces due to functional needs but not developed as planned spaces in line with design criteria. In this context, design criteria and parameters were determined in order to help determine the quality of the space and to suggest the attributes of a good marketplace design.

The associated sub-problems include how to choose a location for a semi-open marketplace designed to serve as a focal point not only for the neighborhood per se but also for the entire city, how to shape the access infrastructure, and how the bicycles', pedestrians', and vehicles' accesses would be provided. Another sub-problem is the requirement of creating urban furniture elements, which are in direct relationship with the quality of space in a marketplace, not only in terms of design but also in consideration of location choices. For example, the design and location selection of lighting elements included in the urban furniture would affect the architectural quality of the spatial appearance, but at the same time, the locations and numbers of such elements would also affect the security of the space in question.

## 3. Literature Review

An investigation of the formal characteristics and design criteria of the marketplaces included the public spaces and a better understanding of their development would ensure an enhanced planning and user experience. Therefore, a literature search was conducted prior to an analysis of the examples by design principles to investigate which parameters were of importance. The design criteria of the marketplaces as public spaces are important for the organization of the entire city as a part of a proper planning network.

It was suggested that one of the most important functions of open urban spaces is to create a social fabric. Certain criteria, including central location, proximity, accessibility, delimitation, decisiveness, focusing, guiding, continuity, provision, conjunctivity, and differentiation associated with those places provide guidance for the user behaviors (Erdönmez, Akı, 2005). İnceoğlu and Aytuğ described the primary needs of users in public space as comfort, rest, active/passive participation, exploration, and human needs (İnceoğlu, Aytuğ, 2009). Whyte defined the basic attributes that should be featured by public spaces as accessibility, people's ability to engage in various activities, the comfort and good image of the space, and offering a sincere space that would support social activities, where people meet each other, and provide further social interaction (Whyte, 2000).

Open markets as the public and open urban areas are classified as food-oriented (fruit and vegetable markets and organic markets), clothing-oriented (clothing and souvenir markets), animal markets (markets intended for Muslim Festival of Sacrifice, bird markets, fish markets), and second-hand product sellers (flea markets, antique markets, and car markets) (Uzgören, 2021).

### 3.1. Concept Of Quality In Urban Space

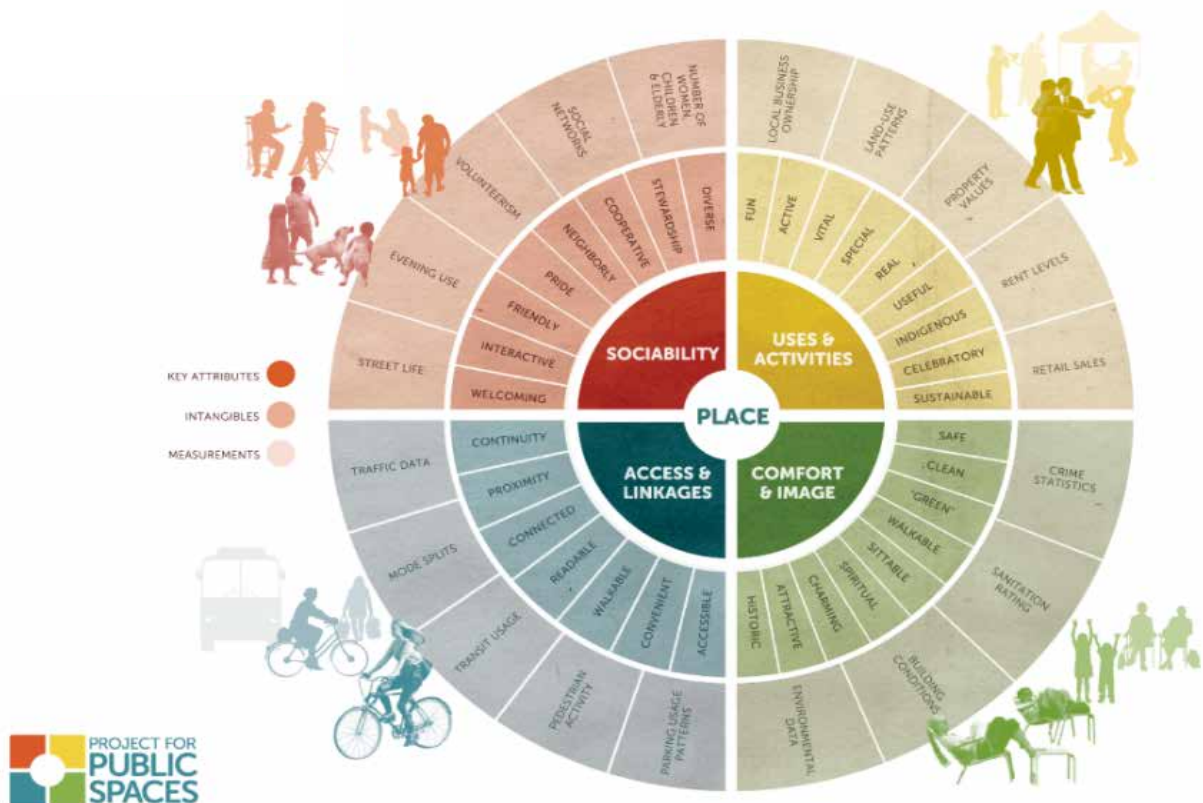
The quality concept is associated with necessity. Uzgören and Erdönmez (2017) suggested that the ability of public open spaces to accommodate certain human needs, including freedom, feeling safe, rest, and comfort were associated with a quality physical environment.

The criteria of the Project for Public Space (PPS), an interdisciplinary, non-profit organization on public spaces, regarding the quality of urban spaces, are provided in Figure 2.

Inceoğlu and Aytuğ emphasized four main topics associated with the quality of public spaces as identified by Roger Tym & Partners for One Northeast. The said topics are;

- Vitality (in terms of use and activities)
- Sense of place (identity, image, and physical quality)
- Entry, connection, and movement
- Community involvement (Inceoğlu, Aytuğ, 2009).

Lynch defined the quality parameters as vitality (a healthy environment), feeling (sense of place or identity), adaptability (the flexibility of a place to adapt), accessibility (people, activities, resources, space, and information), and control (responsible control of the environment) (Lynch, 1984). Van der Voordt referred to as the quality of space in architecture under four headings. These are technical quality, functional quality, aesthetic quality, and economic quality (Van der Voordt, 2005).



**Figure 2.** Criteria that determine the quality of urban space according to PPS (Project for public places, 2022)

The perspectives suggested by different scholars and experts on the quality of urban space are summarized in Table 1.

**Table 1.** Parameters determining the quality of urban space discussed in the literature section

Uzgören ve Erdönmez, 2017	Freedom, feeling safe, rest, comfort
Project for Public Space (PPS), 2022	Sociability, use and activities, access and connections, comfort and image
Roger Tym Partners, 2006	Vitality ( <i>in terms of use and activities</i> ), sense of place ( <i>identity, image and physical quality</i> ), entry, connection, and movement, and community involvement
Lynch, 1984	Vitality ( <i>a healthy environment</i> ), feeling ( <i>sense of place or identity</i> ), adaptability ( <i>flexibility of a place to adapt</i> ), accessibility ( <i>people, activities, resources, space, and information</i> ) and control ( <i>responsible control of the environment</i> ).
van der Voordt, van Wegen, 2005	Technical quality, functional quality, aesthetic quality, and economic quality.

### 3.2. Design Principles Of Urban Markets

The market design criteria in different studies and guides were reviewed in order to determine the relationship between the design criteria of the market places and the quality of the place. It was aimed to determine the parameters to be used in the investigation of the example marketplaces in the study. PPS suggested 10 main topics important for the design of a good market place. Those are listed below with their important points;

The right supplier (*quality, appearance and cleanliness, innovation, competitiveness, locality, attractiveness, and service*)

The selection of right location (*visibility, accessibility, memorability, ease of flow, parking lots, connection to nearby places - restaurant, cafe, etc.*)

The right connections (*identity that reflects the public, public transport connection, local economy, common benefit with nearby commercial units, greenery - bike connections, bringing neighborhoods together*)

The right economy (*sustainable foundation, fund research, booth rental, promoting new investments*)

The right combination (*international competition, variety, different price and quality level, local, balance, clarity*)

The right mission (*intentions and goals, new job opportunities, sustainability, local culture, ability to make people happy*)

The right publicity (*events, passive education, sponsorship and fundraisers, partners, liaising with the community*)

The right value (*quality product, quality experience, local economy, social benefit, local food system*)

The right management (*effective management, customer-seller balance, future-oriented design, open-mindedness, flexibility*)

The right public space (*entrance, seating, maintenance, shading, flexibility, provision*) (URL-1)

A study by Moore emphasized accessibility, physical and psychological comfort, and physical and visual access to landscape and water elements in the spatial design of open market places. A study by Balsas and Carlos, namely "The role of public markets in urban habitability and competitiveness", which investigated examples from different countries, suggested the important design criteria for the markets as follows:

Location (neighborhood or a commercial area, etc.)

Access-transportation (pedestrian, public transport, and parking lot, etc.),

Building design (multi-storey or open market on the ground),

Structural interior design (individual sales stands or as an open store),

Main commercial area,

Additional services (additional spaces such as library, benches, library, social center),

Animation program (concerts, art festivals, etc. indicative of the flexible use of the space),

Administrative structure (private or public) (Balsas and Carlos, 2019).



The main and subheadings of the parameters set for the “Cambridge market area concept project” were as follows: design (operational frequency - permanent or on occasional operation criterion, flexibility of use, booths, area layout (wide space, usable area status, etc.), activities (eating and drinking places), coating (asphalt, reinforced concrete, coating, block coating, tile, etc.), battens, drains, existing pedestrian accessibility, booths (design, module

feature, structure and material feature, roof features), access (road design, parking pockets, bicycle access, pedestrian and handicap access), additional services (electrical resources, internet, infrastructure-drainage, water resources, waste-related systems, toilets and warehouses), and urban furniture (benches, signage, trash cans, mailboxes, telephone booths, bollards, lighting elements).



**Figure 3.** Examples of urban furniture in marketplaces (Riccarton-Cambridge Market Square Concept Design, 2021)



**Figure 4.** Signage examples, Greenville Island-Canada (Project for public places, 2022)

Table 2 shows the data included in the design criteria guide for an exemplary market area in New Zealand.

**Table 2.** Criteria included in the Auckland marketplace design guide (City of Auckland, 2004)

<p><b>Urban Design Guidelines (for buildings)</b></p> <ul style="list-style-type: none"> <li>(i) be located in areas which are not subject to major pedestrian pathways.</li> <li>(ii) be architecturally expressive of their temporary nature.</li> <li>(iii) be simple in form, color, and materials to place emphasis on the activities taking place.</li> <li>(iv) complement, and contrast with, the architectural character of permanent buildings.</li> <li>(v) not intrude on any view shaft.</li> </ul>	<p><b>Street Furniture</b></p> <ul style="list-style-type: none"> <li>(i) design and construct a rich variety of high quality durable public space paraphernalia, such as seats, litter bins, bollards, sign posts, advertising signs/billboards, lamp posts, other lighting fixtures, drinking fountains, plant containers, flags, awnings, canopies, umbrellas, and temporary structures, that reflect the waterfront character of the Viaduct Harbour and avoid imposing a standardised precinct style.</li> <li>(ii) the layout of street furniture should be determined by the plan form of and circulation patterns within the public space. Such furniture should generally reinforce the periphery of the space, leaving the centre clear and free of clutter.</li> <li>(iii) lay out street furniture in a simple, axial, and formal fashion rather than an abstract or haphazard manner.</li> <li>(iv) 'standard issue' elements, such as telephone booths, should be discretely located so that they are easily seen and accessible but do not dominate their surroundings.</li> <li>(v) minimise the number of sign posts and supports by attempting to combine more than one sign or notice on to any one vertical support. Consideration should be given to attaching signs to buildings sympathetically, rather than mounting them on poles.</li> </ul>
<p><b>Car Parking</b></p> <ul style="list-style-type: none"> <li>(i) provide access to car parks from streets and lanes</li> <li>(ii) combine car park access with service vehicle access wherever possible</li> <li>(iii) avoid access ramps running parallel to street edges</li> <li>(iv) restrict the width of any street front car park access.</li> <li>(v) provide pedestrian access to and egress from above or below ground car parks directly within buildings via lifts and stairs not locate access to and egress from car parks in public squares, as this may compromise the flexibility of use of these places</li> </ul>	<p><b>Lighting</b></p> <ul style="list-style-type: none"> <li>(i) optimise public safety throughout the area.</li> <li>(ii) use lighting to enhance and modulate the public environment for night time activity.</li> <li>(iii) carefully consider the type, placement, and quality of lighting as a fundamental design component, including lighting of building facades and details.</li> <li>(iv) vary lighting levels to suit various locations but without compromising security and safety (inadequate lighting) or privacy and character (excessive or harsh lighting).</li> <li>(v) not use fluorescent lighting.</li> <li>(vi) not use coloured lighting, except for special events on a temporary basis.</li> <li>(vii) where the use of neon is desired, ensure that its design and colour is integrated with the architecture to which it is attached, and the expressive of the premises and activities to which it is drawing attention.</li> </ul>
<p><b>Planting</b></p> <ul style="list-style-type: none"> <li>(i) deploy planting as a space-defining materials, species should be selected for their architectural form and sculptural qualities,</li> <li>(ii) not use planting to soften or camouflage inappropriately designed building edges.</li> <li>(iii) respect the urban planting tradition, where trees typically grow out of a horizontal, hard or planted ground plane.</li> <li>(iv) A suburban approach to planting where trees typically arise out of a mass of other plant types is considered inappropriate.</li> <li>(v) where appropriate public and urban space defining forms can be achieved, preference should be given to the use of native planting</li> </ul>	<p><b>Signboards/Signage</b></p> <ul style="list-style-type: none"> <li>(i) ensure that signs are designed to a high standard and complement the architectural qualities, materials, details, and colours of the buildings to which they relate.</li> <li>(ii) ensure that shape of signs and their location on the building, assist in reinforcing a vertical proportional emphasis in the building facade.</li> <li>(iii) avoid free-standing commercial signs.</li> <li>(iv) exclude billboard type signs that draw the eye from vistas or buildings, and are not of pedestrian scale</li> </ul>
<p><b>Ground Coverings</b></p> <ul style="list-style-type: none"> <li>(i) use materials and details in the design of public places which are typically encountered in urban and port-operating waterfront locations. Materials should have a robust, durable quality.</li> <li>(ii) select materials for all components of street development (and maintenance) on the basis of the collective criteria of economy, serviceability, durability and appearance.</li> <li>(iii) surface public places with hard paving which should be simple in design and pattern, and assist in tying surrounding buildings into a coherent relationship.</li> <li>(iv) provide paving and alternative textural, tonal, and modular materials which contribute to human comfort in scale and appearance, and which prevail over harsh surfaces such as asphalt and concrete.</li> <li>(v) consider level changes, especially where these assist in achieving a transition between the levels of land and water, but not to the extent that the flexibility of use of the public place or the access of non-ambulant people is likely to be constrained or compromised.</li> <li>(vi) that street engineering responds to the nature and character of the area. minimise the slope and number of falls provided for the drainage of surface water</li> </ul>	<p><b>Service Units</b></p> <ul style="list-style-type: none"> <li>(i) provide service access points which do not compromise long lengths of what should predominantly be vibrant and pedestrian-comfortable commercial/retail street edges.</li> <li>(ii) combine service access with car park access wherever possible.</li> <li>(iii) provide service vehicle access from streets and lanes.</li> <li>(iv) seek to combine vehicle access/egress points so as to limit their effect on the pedestrian environment.</li> <li>(v) house all rubbish and rubbish containers so that they are not visible from public spaces.</li> </ul>

### 3.3. Case Studies

Two examples from Istanbul and an example from Portugal, an award-winning project implemented upon a design competition, were compared by design parameters within the scope of the study. The two examples from Turkey were selected so as to ensure that they were different from each other in terms of intended purpose and location. The general parameters associated with the design of marketplaces were compiled from different studies and collected under common headings during the literature review. The Yeşilköy Market is a marketplace in the city center that appeals to the middle-income group on a local scale. Bol Pazar Market of Kemerburgaz has a focus on food and beverage and designed so as to appeal to luxury consumption rather than serving the needs of the local population.

The Yeşilköy Market is operated between Florya and Yeşilköy neighborhoods in Bakırköy. The semi-open market area with a permanent location, has a roof cover. Access is provided by public transportation, including shuttles, buses, and minibuses. Although it is easy to access by a private vehicle, the marketplace and its surroundings was not designed in a planned way to accommodate this function, and therefore parking lots are mostly insufficient and traffic jams occur at entrances and exits. There is

no bicycle park belonging to the marketplace. There is no special landscaping area or seating elements around the market. An eating and drinking unit is placed in each corner of the marketplace, which has a rectangular plan scheme.

Bol Pazar is a semi-open marketplace operating in the weekends. The space is inside the Kemer Country Club and consists of food and beverage areas, children's activity areas, and booths, where products, including fruits and vegetables, dry food, and souvenirs are sold. It is placed inside a forest as regards the landscape. It is not located in an area suitable for bicycle or pedestrian access (Bol pazar, 2022).

The Braga Market is a conversion project that received the Loop Design Award in 2021. Dated back to the 1950s, the building was renovated and converted to its present status as a marketplace. Waste storage areas, food and beverage units, and infrastructure systems were completely renewed and aligned with the needs 21st century. A space with high accessibility was created thanks to planned sufficient parking spaces and its location in the city center (Loop design awards, 2022).



**Table 3.** Images of example marketplaces by design criteria (prepared by authors)

	The Yeşilköy Market	BolPazar	Braga Market
<b>Location Selection</b>			
<b>Transportation</b>			
Parking lot		There is no regular parking lot	
Bicycle access/ park	X	X	X
Pedestrian access/ circulation			
<b>Architectural design</b>			
Roof cover			
Floor covering			
<b>Urban furniture</b>			
Lighting			
Signage and sign-boards			
Landscape	X		X
<b>Additional services</b>			

#### 4. Research Results

For the purposes of the present study, the relevant literature on quality of urban space was reviewed to compile criteria in the scope thereof. The concepts that defined the quality of urban space as suggested by Uzgören and Erdönmez, PPS, Roger Tym & Partners, Lynch, and Van der Voordt are given in Table 1. The different perspectives in those studies were grouped under certain titles and presented in Table 4 as the urban quality parameters. These parameters were used in the assessment of the Yeşilköy Market, BolPazar and the Braga Market, which are the sample areas of the study. The sample market places were scored insufficient (-1), ineffective (0), and sufficient (1) in accordance with the criteria. In addition, the design parameters that were important in relation to the urban space quality of the marketplaces were investigated with the help of different studies and design guides of the applied examples. The aforementioned common headings as a compilation of the studies in the relevant literature were used in the generation the design criteria provided in Table 3. The main headings of location selection, transportation, architectural design, urban furniture, and additional services were determined as important criteria in the design of marketplaces.

Three sample areas were assessed by those criteria using Table 3 supported by the images thereof. This assessment is presented in Table 5. In terms of the relevant criteria, the marketplaces were rated as insufficient (-1), ineffective (0), and sufficient (1).

Accordingly, Yeşilköy Market is an easy to access space thanks to its location. It is a popular and widely used area for the users. However, it is inadequate by certain aspects

on the grounds that Yeşilköy Market was not designed as a marketplace from the very beginning but arbitrarily chose to accommodate the needs of the city. This inadequacy in terms of design can be associated with the lack of an architectural identity of the marketplace. To reiterate, such limitations with regard to design adversely affected the sense of place, freedom, and perception of space. The marketplace began its operations on an available space in a central location as required. Therefore, it fails to offer adequate flexibility for future changes or the use of the area for another purpose.

Although the size of the marketplace is limited, Bol Pazar was designed as a social activity hub and an open public urban area outside the city center. Bol Pazar is not easily accessible for most of the inhabitants of Istanbul. The marketplaces appeal to a more special audience. Space diversity is considered sufficient and successful in accordance with such criteria as vitality, sociability, and comfort thanks to various facilities appealing to different age groups and the fact that it was specifically designed for its intended purpose. Its open spaces and the fact that the marketplace was operated in a private area positively affected people's preference of this market and their sense of belonging. The space features adequate flexibility and is sufficient for use for other purposes, including concerts, or for future opportunities such as growth or amendment. The Braga Market was constructed upon conversion of an existing building with a new design. It is a positive example in terms of accessibility and connections with its vicinity thanks to its location in the city center. As an award-winning conversion project, it has no deficiencies associated with the need for social activities and other additional services. It features a high design flexibility. It was designed

**Table 4.** An assessment of example marketplaces by urban quality criteria (improved by authors)

Urban Quality Parameters	Yeşilköy Market			Bol Pazar			The Braga Market		
	-1	0	1	-1	0	1	-1	0	1
Connection/ access									
Comfort/ convenience									
Vitality, sociability									
Sense of place, feeling safe, sensation, freedom									
Adaptability									

**Table 5.** An assessment of the example areas by the criteria affecting the quality of urban space in the context of marketplace design (developed by authors)

	Yeşilköy Market			Bol Pazar			Braga Market		
	-1	0	1	-1	0	1	-1	0	1
<b>Location Selection</b>									
<b>Transportation</b>									
Parking Lot									
Bicycle Access/Park									
Pedestrian Access/Circulation									
<b>Architectural Design</b>									
Roof Cover									
Floor Covering									
<b>Urban Furniture</b>									
Lighting									
Signage And Signboards									
Landscape									
<b>Additional Services</b>									

so as to appeal to everyone from different segments and age groups during the planning stage, and in that respect, it incorporates positive design features with a view to sense of place and sense belonging.

The parameters, which determine the quality of urban space in terms of design, are compiled and presented in Table 3. Location selection was taken as the first criterion in the analysis of the example marketplaces. Yeşilköy Market is a place that is actively used in the city thanks to its central location. It is easy to access with its close connection to public transportation alternatives. There are different public transportation alternatives such as minibuses that provide access to the marketplace. Pedestrian access is easy for the inhabitants of the surrounding area. Nevertheless, the area is a busy in terms of vehicle traffic and is not suitable for transportation by bicycle. The parking lot is not well designed and insufficient. The marketplace roof cover does not have a special design. It was not specifically designed for its intended purpose, and therefore, the floor covering is an asphalt-based hard ground that is not suitable for walking. There are sufficient light and lighting facilities and guiding signage in the marketplace.” There is no guiding landscape element that would make the mar-

ketplace special. There are food and beverage courts that sell similar products at the entry points and at almost every corner of the marketplace.

Bol Pazar is a project that was considered as an alternative to standard marketplaces. It is located in Kemerburgaz area. It is situated away from the city center as regards location selection. It is not placed in a location suitable for bicycle or pedestrian access. Its location in the forest does not allow access by any means of public transportation. Although the only access option is by private vehicle, there is no regular parking lot specifically available for the marketplace. As regards the architectural features, the marketplace was designed so as to employ soft ground covering suitable for walking and a roof cover. Lighting and signage of the spaces and guiding plates in the vicinity are sufficient. The marketplace is located within the Kemerburgaz city forest.

The Braga Market is located in one of the areas with the highest accessibility in the center of the city. Due to the fact that its design was based on a conversion of the old market area, the parking area, social facilities, and architectural parameters were considered in the design. Food

and beverage courts, roof and floor coverings, signboards and circulation areas are highly sufficient for a marketplace. Bicycle parking or access was not considered.

## 5. Conclusion

The present study aimed to investigate the place of marketplaces among other functions within the city and to suggest the development of design criteria and spatial quality in a well-organized city. Two different marketplaces in Istanbul and a marketplace from Portugal were selected as the example marketplaces for the purposes of the study. The relevant literature was reviewed in order to understand the quality of the urban space and accordingly the design criteria suggested for the market places. The compiled parameters were tabulated in the results section, and the example marketplaces were investigated based on those parameters.

Accordingly, it is important to provide good connections and easy access expected for a good marketplace. Nevertheless, the fact that even the marketplaces such as Bol Pazar, which is not accessible by public transportation and not located in the center of the city, is a favorite destination, is indicative of the importance of other design criteria in people's preferences. Furthermore, even an award-winning design, i.e., the Braga Market, failed to address such an important issue as energy consumption and did not include bicycle access in the considerations at the planning stage.

Among the three marketplaces in question, only the Bol Pazar example featured a landscape element as it was located inside the forest area. The other two marketplaces were heavily used, although there were no landscape layouts. The Bol Pazar marketplace was a destination of choice for recreational purposes thanks to its advantageous landscape features over its marketplace function. In that respect, the variety of eating and drinking courts and social units at Bol Pazar and Braga examples, was preferred by the users and allowed those marketplaces to appeal to many different segments. On the other hand, the qualities of the places that offered food and drink were simplex and limited, in the case of the Yeşilköy Market. Therefore, the Yeşilköy Market, did not provide a center of attraction that would motivate the visitors but merely act-

ed as a venue, where people could meet their shopping needs. to the market.

The examples within the scope of the study suggested that a well-designed marketplace, not only met the shopping requirements but also accommodated different social needs. The improved versatility for different activity services increased people's tendency to prefer the marketplace in question. In addition, the examples of Bol Pazar, which was open on weekends, and the Braga Market, which was a converted design, showed that today's marketplaces were not only venues with mere function of selling fruits and vegetables, but also places created with care in terms of design.

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## Interpretations and Comparisons of Pedestrian Movement and Land Use Activities in Kadıköy Region Using Space Syntax Method

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### Abstract

Prevailing theories of urban form suggest that pedestrian movement characterizes land uses, which in turn take advantage of 'natural movement' generated by the grid configuration. The present paper investigated a configurational method of the urban grid for transit movement and as the main generator of movement patterns. A morphological method, namely space syntax analysis, was employed in the Kadıköy region, with an aim to understand, how the pedestrian movement was generated via a vis the urban layout. Axial analyses include defining the central cores of the settlement and determining the most intense movement in those centers, whereas segment analysis determines the scales and limits of the movement towards the points in such centers. Accordingly, axial maps were developed and analyzed in order to forecast the general functioning of Kadıköy grid. Measures of 'axial integration' for properties of the grid and segment analyses in micro-spatial characteristics of Kadıköy were used to investigate transit movement with an aim to gain an insight into movement patterns. Furthermore, correlation of segment and axial analyses were also performed to better simulate the movement. The present paper aimed to investigate the density of pedestrian movement by the characteristics and syntactic properties of urban space that identified limitations in the prediction of movement.

### Keywords

pedestrian movement; space syntax; land use effects; İstanbul

### 1. Introduction

Urban design, public spaces are referred to as continuous and integrated spatial systems that connect every physical element that has an impact on social and economic dynamics within the urban setting. Well-designed spaces with connectivity systems promote pedestrian movement and support a vivid and viable range of uses. Streets are the key elements of this network, which constitute the structure of the urban fabric that is effective on human behavior in the way they use, spend time, and move, which directly affect locations of land use patterns. A conceptual approach through movement patterns was used as the analysis method for the purposes of the present paper.

Space syntax theory aims to describe the consequences of human activities, including pedestrian flow and land use, by means of axial line analyses of road networks (Yamu,

Poplin, Devisch, De Roo, 2017:137; Zhou, 2012:76). It is a kind of spatial language that can provide an insight into the relationship between a spatial form and human behavior. The space syntax theory and its analytical methods have primarily been applied to morphological analysis of architectural design and urban forms (Cuesta, Sarris, Signoretta, Moughtin, 2012:77; Shirazi, Keivani, 2019:101). The space syntax theory features several computational measures used with axial maps in an urban context. The primary syntactic measures of space syntax are connectivity, integration, and control values that are calculated on the basis of the axial lines of the road network structure (Hiller, 1996). The Space Syntax method can efficiently interpret and predict pedestrian flow through spatial configurations to correlate the syntactic parameters of space syntax, including connectivity, integration, and density (Brebba, Galiano-Garrigos, 2016:240). Hillier's Theory of

Natural Movement suggests that street centrality (the configuration of the urban grid) itself is the main generator of pedestrian movement, which emphasizes the importance of urban form. (Zhang et.al., 2022:3)

Understanding the pattern of formations and development of settlements is not merely about the urban form per se. Community relations and types of location used in the settlement are also an effective factor with regard to the formations of the settlement. All those data incorporating the interface features, including settlement texture, relations between buildings and streets, physical fabric of locations, and integration of indoor-outdoor spaces, etc. are the reflection of the social structure of the region in question. The present study aimed to investigate correlations between the variables of the built environment and walking behavior of individuals –evaluating differences based on the uses of the space– street segments and to determine the most reliable measures both in micro and macro scale to analyze the relation between walking behavior and the built environment in Kadıköy.

Space syntax is both a *theory* of urban planning and design and a software-based *technology*. It is an evidence-based approach to planning and design, with a focus on the role of spatial networks in shaping patterns of social and economic transactions. Through a configurational analysis of a street network, the Space Syntax methodology investigates relationships between spatial layout and a range of social, economic, and environmental phenomena. Those phenomena include patterns of movement, awareness, and interaction; land use density, land use mix and land value; urban growth and societal differentiation; safety and crime distribution (Charalambous, Mavridou, 2012, p. 58). Space syntax is a research method within urban systems to understand the spatial distribution of social and economic activities, pedestrian movement, land use and urban centers. It aims to understand how societies produce spaces upon a reading of the spatial development by people in the historical process together with social processes. The method was created on the basis of the data maps of the settlement, the sociological and cultural development stages of that place, and was developed to make determinations based on the foregoing data (Özbek, 2019, p.142). Developed by Bill Hillier and his colleagues in the 1970s the said method allows research to be performed on both an urban and architectural scale.

## 2. Method

In this research, analytical software of DepthmapX 0.8.0 which is one of the tools of the Space Syntax method has been used to examine the syntactic measures and built-environment factors that affect pedestrian volume in different land-use zones. In addition, land use maps were made with on-site observations in order to understand the ground floor usage diversity of the streets. Study area has been chosen as Kadıköy region which is one of the oldest residential and commercial spaces that dates back to 1000 B.C. in Istanbul. Study area incloses Caferağa, Osmanağa, Rasimpaşa and Hasanpaşa regions which are located in Kadıköy central district where examined with axial, segment and intelligibility analysis of Space Syntax method to comprehend through its movement patterns that trigger the daily routines in social and economic activities angles. Definitions of these analyses are explained throughout in this paper simultaneously with the study itself. Our results from this research brings up the determinant factors of pedestrian volume in different land-use areas. Space Syntax analysis assisted us to find out urban vitality in the Kadıköy center region through predicted pedestrian movement that could help to promote the built environment for both architects and planners.

The study area includes Osmanağa, Rasimpaşa and a part of Caferağa neighborhoods which are the most central neighborhoods of Kadıköy. Osmanağa Neighborhood is located at the intersection of the main transportation arteries with the highest daily population and trade volume. Söğütlüçeşme Street, is the main artery connecting the Kadıköy harbor through the inner parts of Kadıköy, and the bull statue which is one of the landmark symbol of Kadıköy. Rasimpaşa is one of the main historical neighborhoods of Kadıköy and a large part of the neighborhood has the status of urban and historical Site. Rasimpaşa neighborhood covers Haydarpaşa meadow, where Haydarpaşa station is located, in the north, and Yeldeğirmeni District, which has a historical urban texture, in the south. Caferağa neighborhood, on the other hand, is one of the oldest neighborhoods and has a high daily population. The neighborhood is locally known as Moda. The historical Kadıköy market is also located within the boundaries of this Caferağa neighborhood (Figure 1).



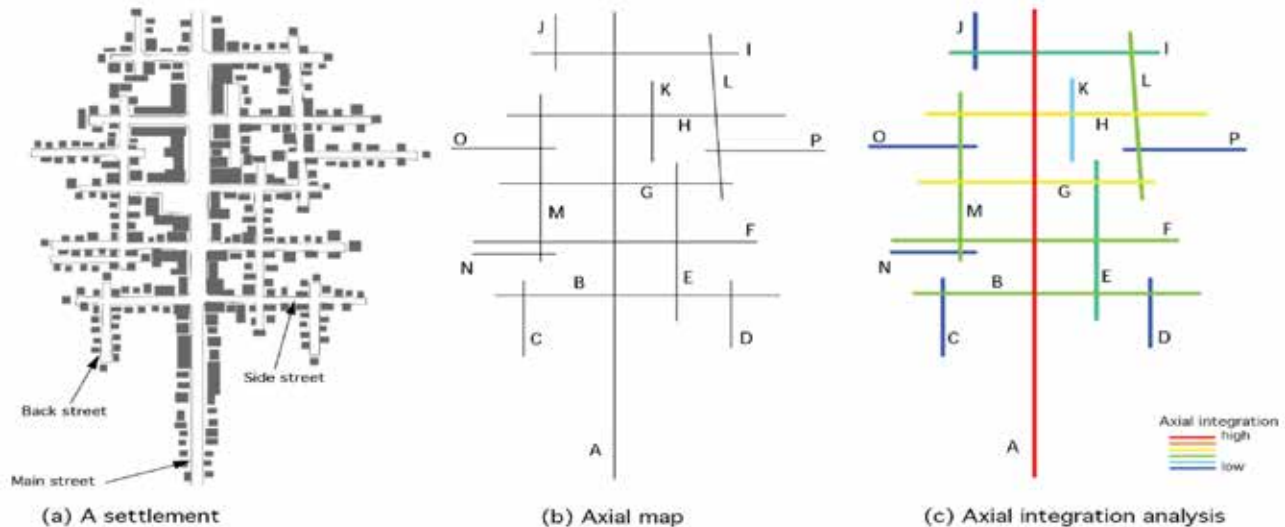




**Figure 2.** Axial map and connectivity maps of Kadıköy region (prepared by authors)

In the first stage of the study, which was designed to serve as a main introduction to analysis, axial maps were developed. Forming the basis of settlement, axial maps help with collection of data that allows to determine the longest distance a person moves in the settlement towards various directions defined as the longest visibility lines in the urban system. Axial maps are a fundamental tool in Space Syntax created by Bill Hillier and colleagues (Babalıs, 2007: 52). These lines are drawn in such a way to obtain the longest to shortest lines passing through all open areas. The longest lines indicate the preferred streets with highest perceived accessibility. As for the second step, connectivity map shows how many direct connections each axis has with its direct neighboring axes. In other words, connectivity measures the number of spaces immediately connecting to a space of origin (Hillier, Hanson, 1984:103) The dark blue lines have one to two connections, whereas the yellow and red lines indicate up to 32 connections (Figure 2).

Axial integration is strongly associated with connectivity. Fewer changes of direction changes in a certain street towards all other streets in the system, produce higher integration, hence it creates inter-accessibility. In brief, the longer the axial line in an urban area, the higher its connectivity to other lines and the higher its integration value, and vice versa (Yamu, Van Nes, Garau, 2021:8). Integration is formed upon measurement of the movements with the least and most potential in the urban system. A city grid system analysis can be performed and mobility can be predicted, while at the same time providing data to explain the mobility, upon calculation of the local and global integration in each correct system. Layouts are related to the number of intersections of axial lines. Therefore, the concept of depth is used instead of metric distance in the method (Figure 3).



**Figure 3.** An axial map (b) and a global axial integration analysis (c) of a settlement (Yamu, Van Nes, Garau, 2021).

Urban areas are defined and investigated based on the depth or shallow degrees of the axial maps. Therefore, axial and segment analyses were carried out using analytical software of DepthmapX 0.8.0 to reproduce morphological analysis covering the Kadıköy region. Recent studies suggested that angular analyses proved to serve as a more useful method to understand pedestrian flow compared to metric and topological analyses (Sharmin, Kamruzzaman, 2018:544; Hillier, Iida, 2005: 559; Omer, Kaplan, 2019).

### Global and Local Analysis of Kadıköy

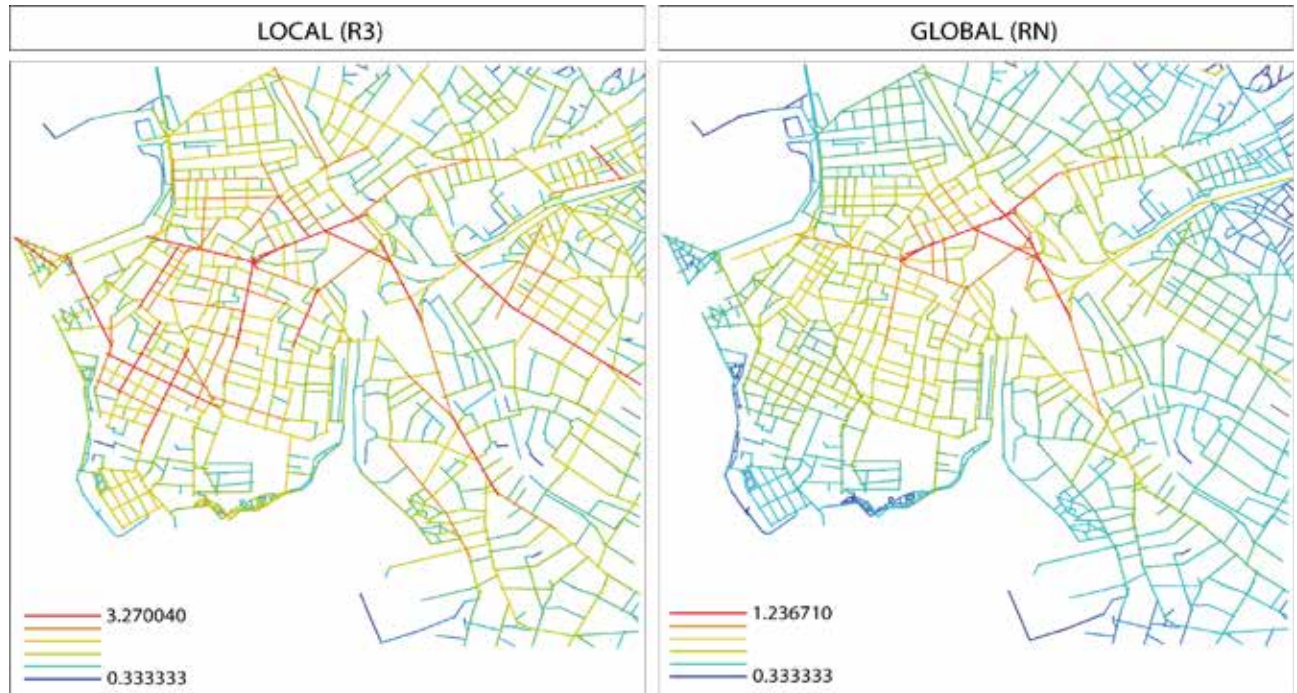
Global integration indicates the degree of accessibility that each axial line has with other axial lines to enable large-scale movement, whereas, local integration indicates the degree of localized accessibility between an axial line and its adjacent axial lines, and the control value of space syntax (Lee, Yoo, Seo, 2020:3). Local analyses aim to understand pedestrian movement in the local system, which indicates a degree of accessibility of the street system with adjacent segments. Local integration values identified many local clusters with high local integration values across Kadıköy. Red axes show streets with the highest integration values, where the blue axes indicate the most segregated ones. Within the scope of the research, global and local integration analyses of the region in the central Kadıköy were performed using the DepthmapX program. Integration analyses give an insight into the mobility and integration levels of the urban open spaces, indicating the most integrated and the most segregated regions (Figure 4).

Global integration analyses generally identify the strong axes in the whole system. The roads formed by such axes provide clues that the movement could be dense at those points, and also indicate different land uses and strong connections to other regions. In the context thereof, the Bull Statue manifests itself as a hub and the focal point of the strong movement based on the global analyses for Kadıköy. From this point, Söğütlüçeşme street towards the north-east direction, passes through the Kadıköy Municipality Building, then weakens and connects to the system. In addition, Bağdat Street, which cuts this street perpendicularly, is a strong axis as well. Söğütlüçeşme street, which connects the Bull Statue to Kadıköy dock, Bahariye Street, a pedestrian-only area, and the first section of Kuşdili Street are some of the strong connections in the large system.

Based on the results of the local integration analysis, the accessible points of the inner structure of the region can be differentiated. Accordingly, by keeping the Bull statue and its surroundings as a center again, Yeldeğirmeni section has a strong structure within itself and another system formed by the grid-ordered streets on the Moda side has strong accessibility as well. Upon local analyses, Fahrettin Kerim Gökay Street, which also keeps the grid structure, emerges as an important axis.

Space Syntax is a method used to measure spatial accessibility in segment analyses, including the integration analyses. The difference of segment analysis is that it also





**Figure 4.** Global integration value (left) and local integration value (right) of road segments in Kadıköy (prepared by the authors)

includes angles formed by intersections of lines, upon which the choice of routes from those intersections can be determined. The indicators and topological distances used in addition to the axial lines are formed by the intersection of the lines that define the segment map based on angularities between the axial lines and the distances measured in the respective sections of the axial lines.

#### Angular Segment Analysis of Kadıköy

To create a segment map, the axial map is broken down into segments at each street intersection. In recent years, the use of georeferenced road-center lines became more popular for the generation of a street network model (Yamu, Van Nes, Garau, 2021:12). Adding the metric radius to the various angular segment integration and choice analyses shows a higher degree of correlation with socio-economic data compared to the topological radius alone (Hillier, Yang, Turner, 2012).

Segment-based angular analyses were performed both in local and global scales that were indicative of different features in activities, actions, and uses of what was developed an output as a result of the analyses of Space Syntax. Analyses can be based on a 200m-scale for a description of the pedestrian movement, a 400m- or 800m-scale

for intermediate walking distances, and a 1200m-scale which allows a measurement of vehicular and ring roads. Accordingly, in Kadıköy region, the seaside areas near Moda district were more walkable in a range of 400 meters. Kadıköy center area was also accessible and connected throughout a 800m-scale, which is a base structure of historical Kadıköy region. Upon an improvement of the scale through 1200 meters, the outer rings, including Söğütlüçeşme and Halitağa Street connections were also accessible by walk. (Figure 5).

Segment angular choice measures the through movement potential of linear structures (e.g. streets and corridors). Through-movement refers to the movement passing through shortest routes from all points to all other points in the layout. The measure of Choice was suggested to predict through-movement (Hillier, Burdett, Peponis, Penn, 1986). Segment angular integration measures the to-movement potentials of linear structures. To-movement refers to the movement to a space as a destination from all others. The measure of Integration was suggested to predict the to-movement. Red denotes a high to-movement potential, where blue indicates a low to-movement potential (Figure 6).



Figure 5. Segment Choice Analysis in the range of 400-1200 meters (prepared by authors)

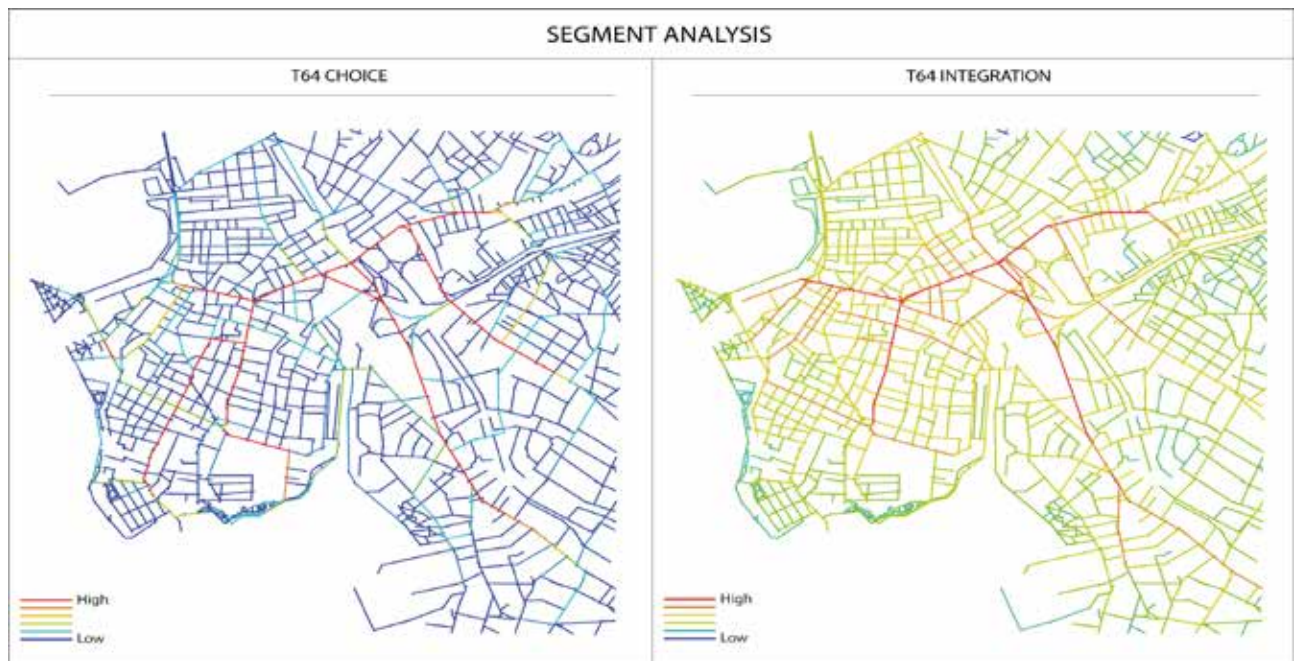
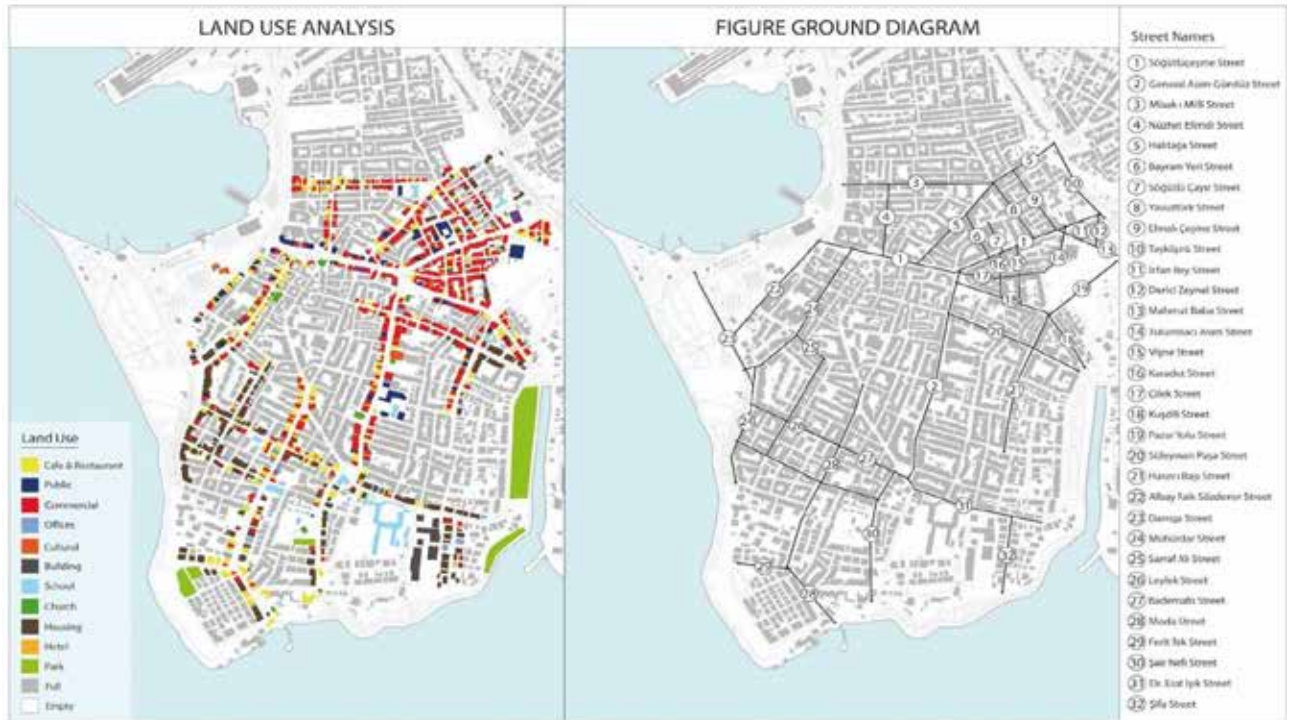


Figure 6. Choice value (left) and integration value (right) of road segments in Kadıköy (prepared by the authors)



**Figure 7.** Study area land use analysis and important streets (prepared by the authors)

### Land Use Analysis of Kadıköy

Land use mix is one of the cornerstones for urban sustainability vis a vis functional segregation and zoning policies. It was also conceptualized as a key ingredient necessary to support walking and a prerequisite for urban proximity dynamics (Carpio-Pinedo, Benito, Lamíquiz, 2021: 23).

Upon the ground floor uses analysis of Osmanağa Neighborhood, Soğutluçeşme Street, Kuşdili Street, Çilek Street, Süleymanpaşa Street, Nüzhet Efendi Street, and the beginning of General Asım Gündüz Street, the foregoing had dense retail-trade, where the number of residential uses in the neighborhood was less compared to the number of office and commercial uses (Figure 7).

The mobility in the neighborhoods within the scope of this study as suggested by the Space Syntax method in the system had higher values of accessibility. This data was overlapped and assessed by the ground floor land use and figure-ground diagram analysis. Those analyses aimed to see how the said areas were connected to the city center and whether there was a correlation between land use data and accessibility and mobility (Figure 8).





**Figure 8.** The overlaps of land use analysis and 1200 meters choice analysis (prepared by the authors)

### 3. Discussion and Conclusions

Along with the retail uses, including cafes, restaurants, and hotels, there were also educational and residential uses on the streets of **Rasimpaşa** Neighborhood. There was a high concentration of cafes and restaurants along with accommodational buildings on Misak-I Milli and Halitağa streets. Gazi Mustafa Kemal Paşa school was located at the intersection of those two streets indicative of educational use. In Nüzhet Efendi Street (Figure 10), there were hotels besides retail-commercial businesses. On the other hand, ground floor residential use was also observed in Elmalı Çeşme Street.

**Caferağa** neighborhood, one of the oldest neighborhoods of Kadıköy, had the highest range of daytime population among others. Located on Moda Cape, the neighborhood, was mostly referred to as the Moda District. The Moda District is one of the most reputable districts of Istanbul thanks to its seaside, historical background, architectural qualities, and restaurants. At the same time, it is well-known for its icecream shops and tearooms located on the nostalgic tram line. In Caferağa neighborhood, Mühürdar Street is located in the historical Kadıköy open market where the ground floor usages were mostly spared for cafes and restaurants. At the junction of Mühürdar Street and Leylek Street, residential uses were concentrated on the ground floor. In the junction of Moda Street meets with Leylek Street, the uses for cafes and restaurants on the ground floor were more dense as regards the retail uses (Figure 10).





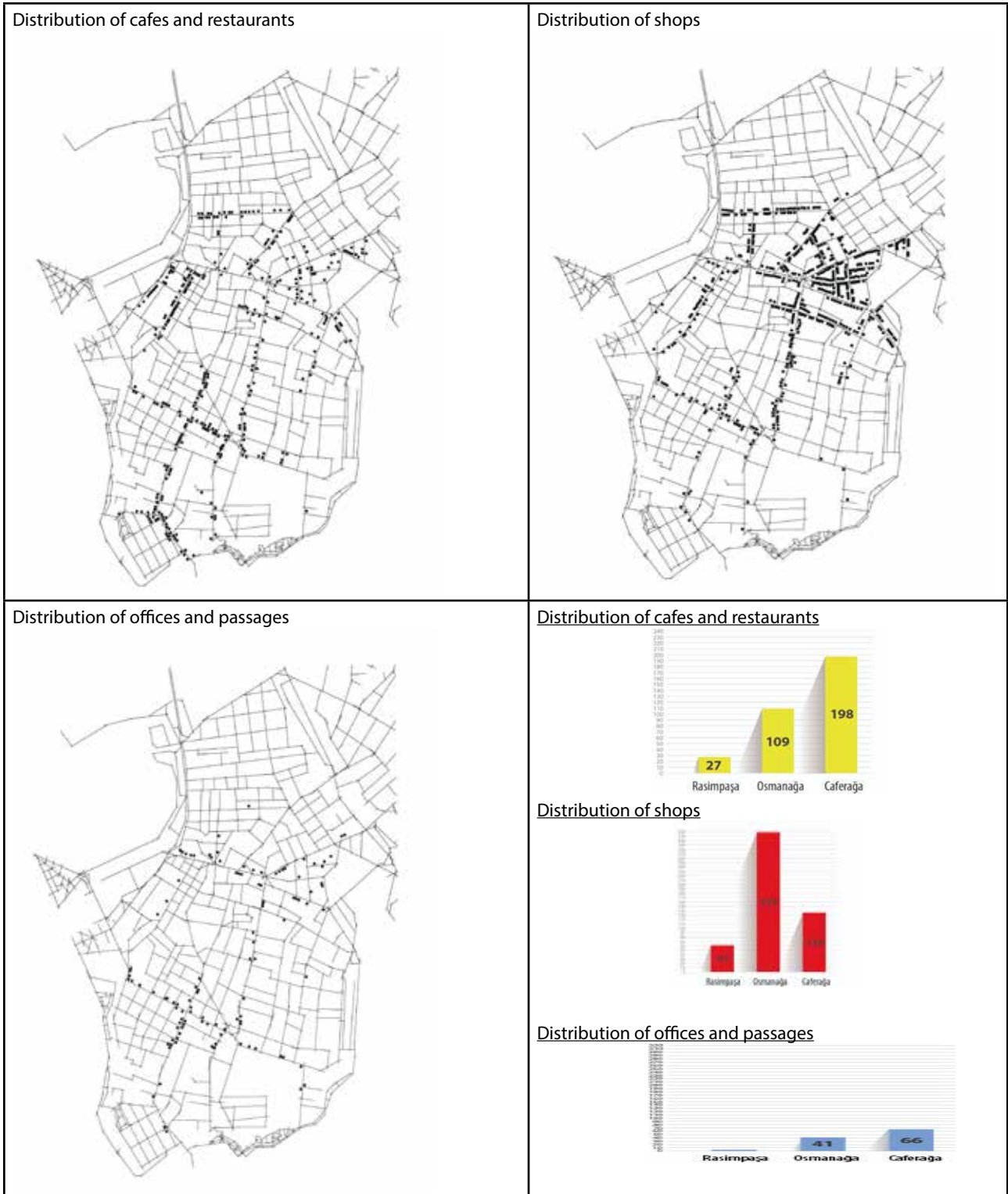
**Figure 9.** Nüzhet Efendi Street- Misak-ı Milli Street- Yavuztürk Street (photographs by the authors)



**Figure 10.** Moda Street, Leylek Street and Mühürdar Street (photographs by the authors)















**Figure 11.** Söğütlüçşeme Street- Bahariye Street- Kuşdili Street (photographs by the authors)



**Figure 12.** Distribution of cafes and restaurants, shops, offices and passages in study areas (prepared by the authors)

Table 1. Local integration values of three neighborhoods with their Evaluations. (prepared by authors)

<p>CAFERAĞA NEIGHBORHOOD</p> 	 <p>Emin Bey, Leylek Street and Bademaltı Street (A)</p>	 <p>Moda Street (B)</p>	 <p>Saadettin Street (C)</p>
R3 Value	2.990849	2.500265	1.381203
Sidewalk	Yes	Yes	No
Presence Of Shops	Yes	Yes	No
Evaluation	<p>This axis consists of the junction of three streets. There are mostly residential areas on Emin Bey St. Shops, cafes, restaurants and schools on Leylek St., and cafes and restaurants on Bademaltı St.</p>	<p>There are lots of cafes and restaurants along the Street also the end of the road connects to the beach road.</p>	<p>The Street has no connection with other streets as it is a dead end. Therefore the street is only used by residences.</p>
<p>OSMANAĞA NEIGHBORHOOD</p> 	 <p>Söğütlüçeşme Street (A)</p>	 <p>Kuşdili Street (B)</p>	 <p>Özpark Street (C)</p>
R3 Value	2.990849	2.500265	1.381203
Sidewalk	Yes	Yes	Yes
Presence Of Shops	Yes	Yes	No
Evaluation	<p>Söğütlüçeşme St. Connects to Hasanpaşa Neighbourhood following the six road (Bull), which is the meeting place from Kadıköy pier. There are usually restaurants, shops and banks on the Street. The Street leads to Söğütlüçeşme Marmaray and metrobus station, which is the important transfer point of Kadıköy, and Kadıköy Municipality.</p>	<p>Kuşdili Street in the 1920's, shops where car manufactures, car mechanics, blacksmiths and hardware stores were constantly operating were lined up on both sides of the Street. Kuşdilli Street leads to the Yoğurtçu Park and Kurbağalidere (Kuşdili watercourse).</p>	<p>The Street has no connection with other streets as it is a dead end. The Street is generally used as a parking lot by the residents.</p>
<p>RASIMPAŞA NEIGHBORHOOD</p> 	 <p>Yavuztürk Street (A)</p>	 <p>Elmalı Çeşme Street (B)</p>	 <p>Ortaç Street (C)</p>
R3 Value	2.851881	2.622736	0.947875
Sidewalk	Yes	Yes	Yes
Presence Of Shops	Yes	Yes	No
Evaluation	<p>During the management of I. Abdülhamid (1774-1789), four windmills had been constructed in Yeldeğirmeni to supply the need for flour for the palace and the city. These windmills had been destroyed in 1903. The place where these two streets (Misak-ı Milli and Yavuztürk St. ) connect and become a square is where the last remnants of these windmills are.</p>	<p>The Street which can be entered from the right side of the Söğütlüçeşme Mosque reaches to Halitağa Street. There is a school on the Street. Also there are many shops and cafes along the Street.</p>	<p>There are residences along Ortaç Street, which is a dead-end Street. At the same time, Sidonya Hotel is located on this Street.</p>



**Osmanağa** neighborhood had a very high level of commercial activities. Within the boundaries of Kadıköy district, the foregoing was the only neighborhood, which maintained more offices/workplaces than residential spaces. It had a quiet and dynamic daytime nature as one of the centric neighborhoods of Kadıköy located close to the intersection of transportation networks with a number of commercial units, including cafes, bars, and restaurants (Figure 11)

A comparison with regard to the ground floor uses of the above three neighborhoods (cafes, restaurants/shops, and offices) indicated that Caferağa Neighborhood had the highest number of cafes and restaurants, while Osmanağa had the highest number of retail shops. Contrarily, Rasimpaşa Neighborhood had the least number of ground floor activities, but hosted mainly residential areas (Figure 12).

Belonging to our local integration analysis there are a number of streets that have indicated a high degree of accessibility patterns. In Table 1 these comparisons have been made with their ground floor features.

The analysis in Kadıköy confirmed Hillier's crucial processes regarding the urban development. The micro-economic scale businesses like cafes and shops aim to adapt the settlement to the overall development of the city, through its global spatial structure. The present study confirmed that the interaction was well facilitated by the distribution of commercial activities and pedestrian movements. Movement patterns in Kadıköy had a significant relationship with its structural system. Thanks to its long history, Kadıköy developed its own spatial logic that connected with its surrounding urban spaces.

To create a well-functioning built surroundings, spatial structure is crucial rather than its architectural quality, or open spaces that gives form to space. This approach leads us to think more about the network systems when it comes to designing the urban spaces. Strong spatial structures are determinant factors that create land usage and designing forms. Land use strategies trigger the density of people in streets. With the help of this method it is possible to calculate the potentials of urban spaces and their effects for future development of cities.

## Conflict of Interests

The authors declare no conflict of interests.

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## The Effects Of Square Designs On User Behaviors: The Case Of Taksim Square

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### Abstract

The squares as indispensable open spaces in the sociological, physiological and psychological context of urban life, not only create common platforms for various activities, but also serve as a communication space between the city and its residents. Human beings are the primary factor of the squares. How square designs affect user behaviors is a crucial question. Accordingly, the present study focused on Taksim Square, one of the important squares of the historical city of Istanbul in sociological, cultural, political, and economic terms, and investigated the relationship between design and user behavior in this particular square. The present study adopted an observational research construct, where the study data were captured on the map of the square as user and action inputs, and analyzed in the context of circulation and usage. The results were indicative of the fact that users might tend to use the square as a transit route in such square designs that fail to offer sufficient space for activities, functional diversity, and urban fixtures. Nevertheless, the squares attracted users and channeled them to spending more time in the square in cases when decorative elements, greenery elements, green textures, and seating units were included in the design.

### Keywords

square design; user behaviors; Taksim square; spatial usage

### 1. Introduction

As an expression of public open spaces dedicated to the community of citizens, squares (Ali et al., 2019; Massaro et al., 2021) take different forms yet accommodating similar activities in different countries. The purpose of square organization is to ensure that individuals come together in larger groups in an open space (Giritlioğlu, 1991). Incorporating physical, social, aesthetic, economic, and political functions, the urban spaces serve as a vivid venue, where architecture and sociology intersect, where people can get rid of loneliness, participate in society, and create synergies (Çelik, Türkyılmaz, 2020; Zölch et al., 2019).

Squares are one of the important public spaces of the cities. These venues are spaces that reflect the identity and quality of the city, provide information about the history of the city, and have an important place in urban designs and planning. Furthermore, squares are also social spaces, where the city inhabitants can socialize,

spend their leisure time, carry out their social activities, and mentally relax. Therefore, squares contribute to the generation of the society by preparing the medium for the communication between the individual and the society (Erdönmez Akı, 2005). As a matter of fact, the social impact of the square designs can be better understood when the interaction between the space and the user is taken into consideration. The purpose of the use of the square is to allow interpersonal relations and information exchange. The exchange of information and the mode of interaction may be of a regulated or unregulated nature. Regulated relationships imply interactions based on an order and use subject to certain rules, including official parades, exhibitions, and concerts, etc. Whereas, spontaneous activities that are not planned in advance, that are not subject to certain rules qualify for unregulated relationships (Giritlioglu, 1991).

As a public open space, squares were reported to relieve mental fatigue in individuals (Kaplan, 2001), reduce stress

levels (Nielsen, Hansen, 2007), and meet the daily needs of urban public life (Chen et al., 2016), and defined as important “focal points” within the open space system, “a surface of contact and communication” for social strata, and “relief spaces” within the densely structured urban fabric (Kürkçüoğlu, 2016). Moughtin suggested that the most important physical quality of the squares was closeness, defining the squares as the places with sculptures, fountains, and lighting, where people met with each other and socialized (Moughtin et al., 2003:123).

The selection of the design elements, which create the squares and provide their unique identity, is important in the design of these spaces. For example, sculpture and plastic elements are utilized both as decorative items and as works of art in squares. Therefore, their location, choices of place, and relations with other elements should be well and compatible with the environment, and their size should be proportional to the square (Çetiner 1979). Water and water surfaces, water mirrors, and water pits can also be used in the squares. Marcus and Francis (1990) suggested that the water elements should be placed close enough to the seating areas for people can hear the sound of the water. Water surfaces have as important effects as the greenery material.

The squares are not merely transit places, they can host a range of different activities. The examples in pedestrian-intensive squares include motion-based sketches, painting and cartooning, singing, playing instruments, pantomime, illusion, dance, reading, and puppet shows among others. The squares as the meeting place for the city inhabitants and visitors, are public spaces where people can be relieved from the city's chaos, relax, and interact with each other (İnceoğlu and Aytuğ, 2009), where the individuals not only interact with each other but with the city as well. The squares also mitigate the burden of the city as venues for socialization. The design of the square also affects the behavior of the individuals depending on the interaction of the society and individual with the space.

Relevant studies indicated social interactions as the primary factor in public spaces (Askarizad, Safari, 2020; Gehl, 1987; Whyte, 1980). A properly planned square that can meet the demands of the users with an efficiently

formulated design can not only improve the quality of socialization of the users, but also strengthen the bond between the city and the city inhabitants.

Observations and investigations showed that people and human activity were the greatest object of attention and interest. Even the modest form of contact based on merely seeing and hearing or being near to others is apparently more rewarding and more in demand than the majority of other attractions offered in the urban public spaces (Gehl, 1987). The higher the number of people using the space, the more attractive the space will be to other users. Furthermore, high visual quality and appropriate arrangements for certain activities, including walking and resting are other attributes that would improve the attractiveness of the space for the urban residents (Barnet, 1982).

Squares are also the primary venues of focused interaction. Focused interaction occurs when individuals pay direct attention to what others say or do. Goffman defines this moment of focused interaction as encounters (Goffman, 1971). People tend to maintain communication with others, even if they do not talk to them directly in squares with intensive focused interaction. The most frequently used venues of the squares are the points with dynamic views (Gehl, 1996).

Another important factor as regards the use of squares is the season (Djukic et al., 2016). Squares as open spaces are mostly preferred during spring and summer season, where activity dramatically drops in winter due to adverse climatic conditions. Furthermore, the times of use of the square are also associated with climatic conditions. As a matter of fact, results of a study by Şavklı and Yılmaz (2013) reported that the most preferred time period for the spring/autumn seasons and summer was 14:00-16:00 hours (29.8%) and 20:00 (31.6%), respectively, where the same was 12:00-14:00 hours for the winter season (31.3%).

In a very general sense, the use of squares can be investigated under the two headings of circulation and activity. Although with varied qualities, almost every square provides both a transit route/circulation and a venue for



activities. As a concept that implies continuous mobility, circulation is of particular importance for the squares. This is because of the fact that squares provide a transition route by assuming the function of circulation, binding the buildings and offering a dynamic space character. In the urban setting, sometimes surprising the user and often providing them with directions, the squares that connect roads and streets have a circulation construct per se. Spaces are dynamically experienced through circulation (Clerkin, 2005). At the same time, squares assume spatial and functional tasks in the city by ensuring mobility and providing directions. This is indicative of the fact that there is a high level of user experience in the squares. Small-sized squares are places, where people can stop and rest, relax, and get rid of the chaos of modern city life, as closeness can be more readily ensured. Successful urban squares are designed for people to enter, stand, have a seat, dance and perform, and watch other people participating in these activities. Çakmaklı classified the activity characters in the squares into two groups: Static space (sitting, resting, a perceived clarity and integrity regarding the space) and dynamic space (circulation, transportation, and being interesting) (1992:5). In addition, squares also allow a variety of activities, including meetings, gatherings, having fun, rest, strolling, and sightseeing, etc. Alexander (1977) suggested that it was important to include areas of activities in square designs, where users could spend good time, use their free time, and not get bored. Functionally versatile squares, which accommodate a range of activities would also serve as centers of attraction for the users. Nevertheless, there may be differences as regards participation between day and night activities in the squares.

Thomas (2007) asserted the necessity of having enough numbers of ergonomic and comfortable seats with backrests and armrests in popular squares. Seating facilities provide the users with the opportunity to watch, observe, and enjoy the environment. Proper seating arrangements would also increase the time the users usually spend in the space. Therefore, due care should be taken for the appearance and orientation of the space in the placement of the seating groups, which should provide the opportunity to sit alone or in groups under the sun or shadow. The seating elements should be oriented directly

towards the roads or transit users (Carr, Francis, Rivlin, Stone, 2007; Cartens, 1993).

The squares as open public space also play an important role in ensuring cultural and social sustainability, and in that context, they are a necessity for the society. As the main venue of social interaction, the squares are also an appropriate ground for understanding the relationship between the place and action. Accordingly, the present study aimed to question the existence and quality of the relationship between square designs and user behaviors in consideration of the usage times and activities performed in the squares.

## 2. Materials and Method

### 2.1 Case Study Area

The sample area of the study is Taksim Square, which is one of the most important squares of Istanbul in historical, cultural, political, and economic terms. Several strategic urban transportation axes from different parts of the city meet in Taksim Square. Today, the Square acts as a center of energy, where people from different parts of the metropolitan city meet and disperse, and it is well-known also by the domestic and foreign visitors. Thanks to its prevailing position in urban life, it is a central area with an international identity (Gürsel, 2012) (Figure 1). Taksim Square has hosted a number of cultural, historical, and political experiences during the Republican period, and thus, the Square acquired a distinctive identity in the context of Istanbul. Taksim Cumhuriyet (Republic) Square became the most important area in Istanbul by hosting important national day celebrations, and over time, witnessed to prominent social and historical events. In that respect, it has an important place in urban memory (Hasol, 2020).



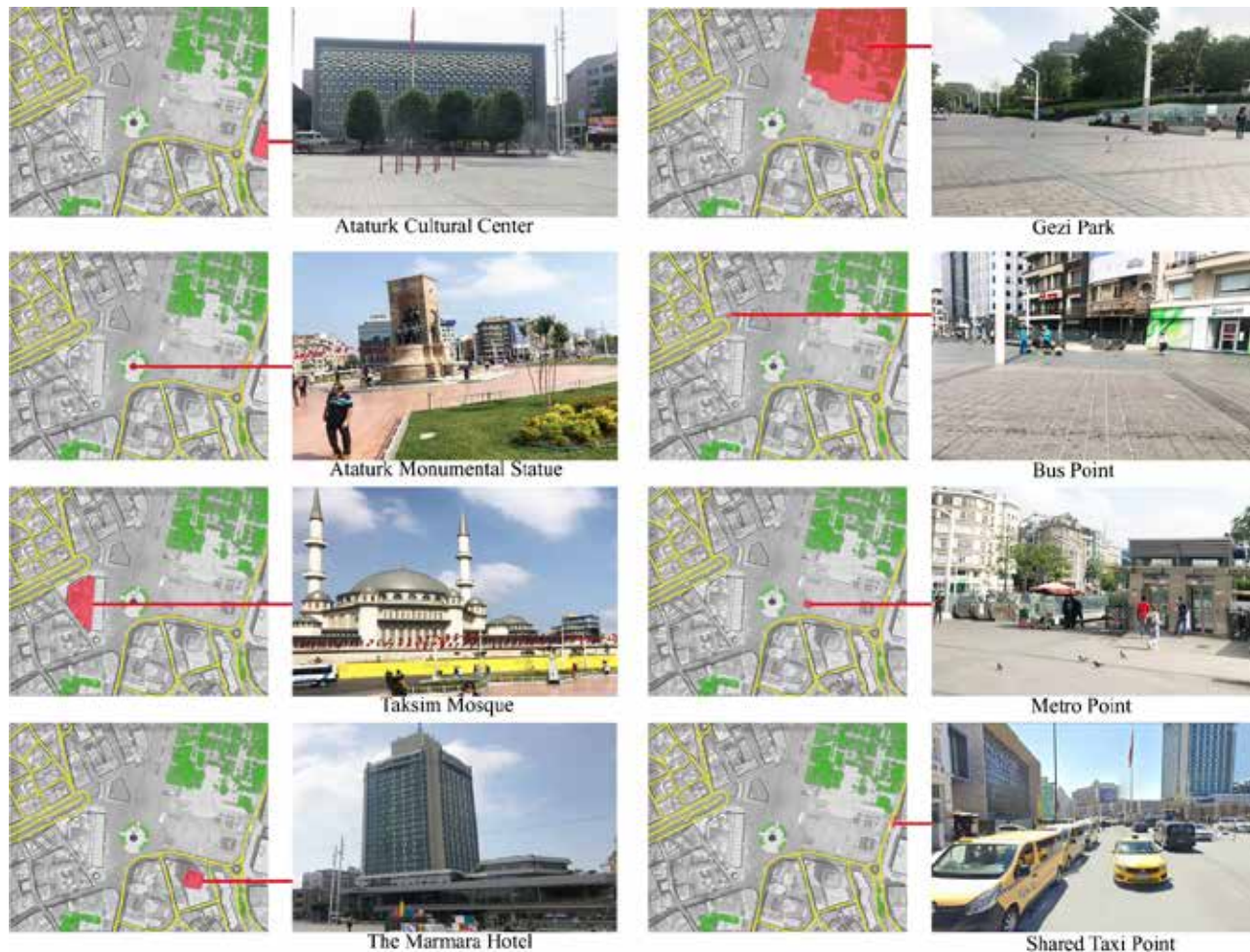
**Figure 1.** Taksim Square location (prepared by the authors)

Gezi Park to the north of the square, Atatürk Cultural Center to the east, The Marmara hotel, a well-known building to the south, newly built Taksim Mosque to the south, Hagia Triada Church to the southwest, and a statue of Mustafa Kemal Atatürk, the founder of modern Turkey, in the center. There are also metro, bus and *dolmuş* stations in the square and its periphery. There are cinema halls, theaters, exhibition halls, shops, and showrooms, and eating and drinking places on the roads to the square. Taksim square, which features both vehicle and pedestrian traffic, is also frequently used for political demonstrations, press statements, official ceremonies, and celebrations (Figure 2).

## 2.2 Method of the Study

Observations and investigations show that people and human activity are the greatest object of attention and interest. Even the modest form of contact of merely seeing and hearing or being near to others is apparently more rewarding and more in demand than the majority of other attractions offered in the public spaces of cities (Gehl, 1987). An observation-based methodological pattern was used for the purposes of the study. In the observation, the first stage of the field study, a non-participant observation

strategy was applied in order not to affect the natural behaviors of the users and therefore to obtain as accurate data as possible. In that context, the square was observed at various intervals for 30 days, by means of 30-minute visits, during weekdays and weekends, in the morning, at noon and evening, for a total of 18 occasions. The study was carried out on Saturdays, Sundays, and Mondays in May. The visits were carried out between 07:00-09:00 am, 12:00-02:00 pm, and 20-22 pm on weekdays and weekends. During the observation stage, the most frequently preferred points and the circulation routes followed by the users in case of forced transition were noted and each observation was captured on the square map as 30 minutes/number of users and action. Accordingly, the points and routes that were more/less frequently preferred by the users were investigated. Thus, it was possible to note how the square designs affected the user behaviors.



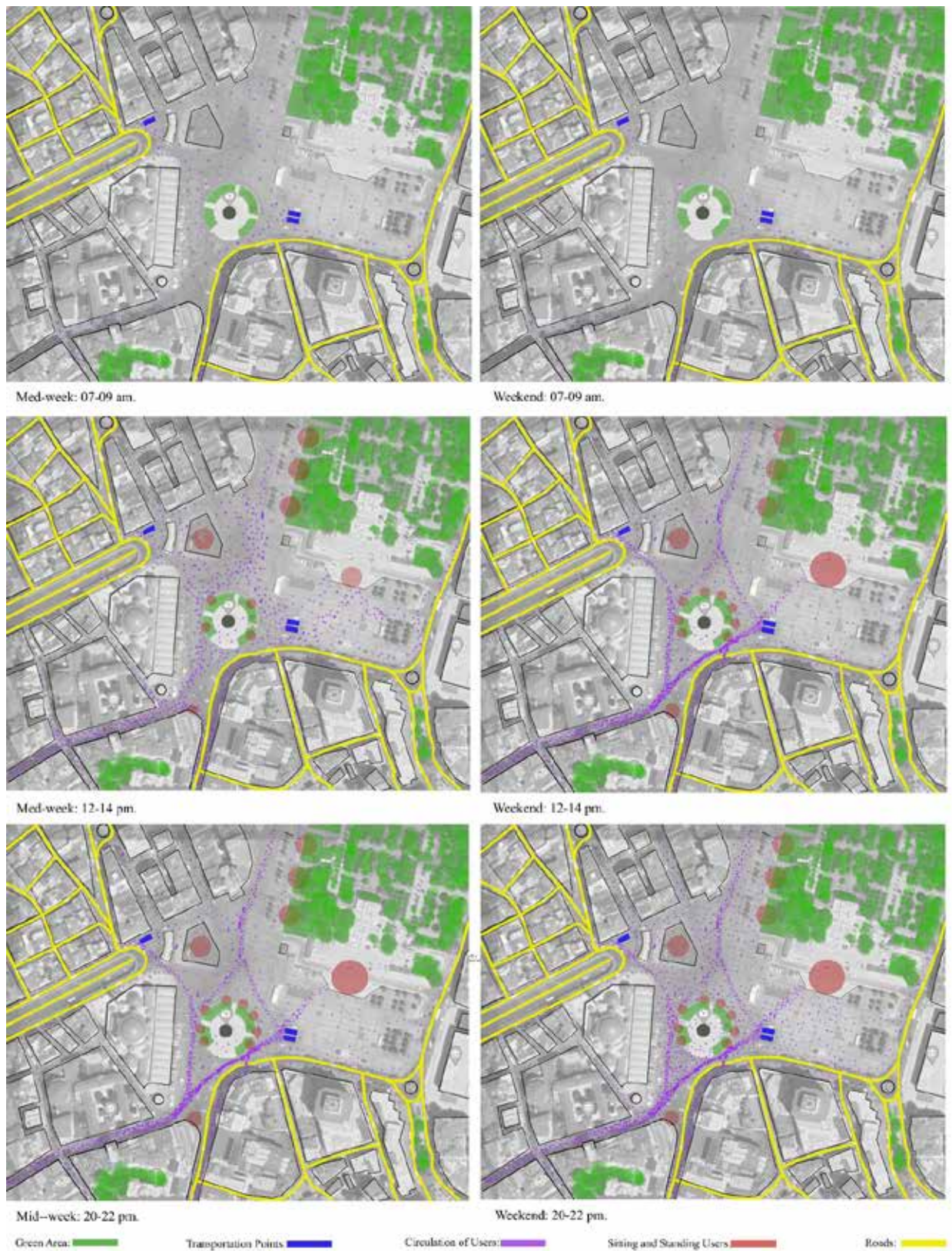
**Figure 2.** Important Points in Taksim Square (prepared by the authors)

### 3. Results and Discussion

The present study focused on the relationship between the square designs and user behaviors, included Taksim Square as its case study, and adopted an observation-based methodology for the purposes thereof. The study data were captured on the map of the square and the dynamic routes of the users and the locations, where they stopped/paused were shown on the maps (Figure 3). As mentioned above, those maps were assessed on the basis of the circulation and activities of the users. User movements are shown in purple, stop/pause/rest areas in red, green areas in green, public transportation points in blue, and vehicle passage routes in yellow color on the maps.

Urban public squares should be located so as to provide multiple access routes for traffic and transportation and within the proximity of pedestrian ways. People from or to the metro, bus, and dolmuş stations located in the square and its immediate vicinity create a great deal of activity in the square during the rush hours at noon and evening. The said mobility was mostly observed between the public transportation stations and the alleys. These alleys host a variety of showrooms and cafes, as well as street performers, entertainment venues, a number of associations and clubs. Those axes are lined with historical buildings from the 19th Century (Figure 4). The fact that the square is quite busy at noon and evening although barely used in the morning, indicates that users, who want have





**Figure 3.** An Observation-Based Analysis of User Behaviors in Taksim Square (drawn by authors)

fun and spend pleasant time, see the square as a passage route to those streets. Waiting, meeting, and transiting are the main activities in the square, where social activities are relatively scarce. However, the fact that squares have a meaning beyond merely a transit route should be taken into consideration in square designs and rich functions should be incorporated so as to allow individuals engage in further activities in such areas. Another issue is that the busy vehicle traffic complicates pedestrian crossing. This also is indicative of the safety problem posed by vehicles for pedestrians.

The results indicated that Taksim Square was less frequently used in the morning hours both on weekdays and weekends, while it became quite crowded in the afternoon and evening hours (Figure 5). Those results were consistent with the results reported in Gehl's study in 1996. Gehl concluded that the squares were most frequently used at noon and afternoon (Gehl, 1996).

Although scarce, there were users, who sit, lingered, stood, and rested in the square. Users made use of the elevation around the monument as well as the seating units for rest. It was observed that the square served a meeting point for users. There were many people waiting to meet in front of the large monument (Figure 6). In this context, seating groups are another consideration of significance in the design of squares. In that regard, urban fixture, where people can sit, relax, watch around, and chat with other people, is important.

Another busy point of the square is the route Gezi Park, the green area. Although there are not many showrooms, eating and drinking places, etc. on this route, users take it as both a passage route and for rest and lingering (Figure 7). The fact that individuals walked into and spent time in the park with greenery and trees once again showed how important the nature and/or natural elements were in the design of squares. This is important especially for the major cities, where green areas are decreasing each day. The inclusion of greenery elements in the square designs would make the square more attractive for the users.



**Figure 4.** Alleys Opening to the Square (Day and Night) (photographs by the authors)





**Figure 5.** Morning hours vs. afternoon/evening hours (photographs by the authors)



**Figure 6.** People sitting and waiting around the monument / people at the seating units (photographs by the authors)



**Figure 7.** Greenery in the square as a resting place and as a route (photographs by the authors)

#### 4. Conclusions

Carr et al. (1992) suggested that successful public spaces should be accessible to everyone and respond to the needs of the users, emphasizing the necessity of establishing a meaningful relationship between the space and the user. The present study with a special focus on Taksim Square showed based on the spatial behaviors of the users that the design of the square was far from meeting the user's needs, and that the users tended to utilize this square as a transit route rather than an urban space for sociability. The results of the present study suggested that squares had a value beyond merely a transit route, and that should be considered in the design of squares.

As a result of the study, the following recommendations can be made for the purposes of square designs:

- Create rich functional areas in square designs
- Consider circulation and usage areas separately but as a whole
- Use sufficient number of seating units, where users can take a seat, relax, and chat
- Design on the basis of an reachable, accessible, and inclusive approach,
- Make flexible arrangements for different user groups
- Include natural elements and green spaces in square designs

- Consider the square with its immediate surroundings in a context
- Provide appropriate venues for artistic activities for public participation
- Include installations, sculpture, etc. arts objects and attractive items
- Consider seasonal preferences

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## An Investigation of Urban Equipment Design in the Historical Environment based on Hagia Sophia - Sultan Ahmed Square Example

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### Abstract

Historical environment requires a respectful act of conservation with a view to sustain cultural heritage. The increasing trend of continuous change in cities is associated with emergent requirements in physical, economic, and socio-cultural fields. There is an ongoing quest for solutions in the fields of architecture and urban planning aimed to accommodate the ever-changing conditions. Nevertheless, despite the projects at city and building scale, the same are uncontrolled or inadequate at the detail scale. Therefore, approaches adopted in the industrial product design level may fall outside the scope of the conservation project in historical environments. The use of urban furniture is required in the public squares in historical environments. However, these products may be in disharmony with their historical environment and have an appearance that harms the urban culture. In case negligent installation techniques are used for the equipment element, this may lead to destruction of the historical environment and hinder the sustainability of cultural values. The “urban equipment element” term was adopted for the general definition of the objects, products, elements, equipment, units, and modules investigated within the scope of the study. The present article aimed to investigate the criteria that could ensure that urban equipment elements were in harmony with the historical environment and help with conserving cultural heritage. The design and classification criteria of urban equipment elements were investigated within the framework of the integrity and harmony of the historical city. For the purposes of the field study, the criteria associated with the functional type, user type, assembly technique, duration of use, infrastructure use along with visual relationship (form-color-tissue-material) in interaction with historical environment, and experiential relationship with environment in the scope of the historical vicinity of Hagia Sophia and Sultan Ahmed Square were analyzed. It was concluded as a result of the that urban equipment elements in historical environments should be designed in an original appearance in harmony with cultural heritage in relation to each other; thus, cultural sharing and transfer might also benefit from experiential relationship with the historical environment; and furthermore, combining multiple functions in urban equipment elements would eliminate visual chaos in the historical environment, contributing to visual harmony.

### Keywords

historic environment; urban equipment elements; industrial product design; harmony criteria

### 1. Introduction

Cities gradually expand around the central location, where they were first established, throughout the historical process. The area of the first settlement is generally the historical environment. The definition for the historical environment as prescribed in the Venice Bylaws included monuments, architectural works, and works of all scale in urban areas and rural settlements, which are witnesses of

history, (Venice, 1964, ICOMOS, 2011, p.2). The physical and social structures of the cities, which shape their cultural history, constantly change as the city expands around the central location of their settlement (Topal, 2004, p.277). Each city consists of districts that reflect different value systems, lifestyles, and cultures (Rapaport, 1977). Although the historical environment is particularly separated from the other parts of the city, it is equally affected by

<p><b>STRUCTURE</b> Larger Scale Level Historical Building Able to meet all the functions of one or multiple human needs</p>	<p><b>MODULE</b> Small Scale Level <b>Buffet</b> Component with a self-supporting cover</p>	<p><b>SYSTEM</b> Joint Level <b>Security System</b> Structure section consisting of many units and combinations</p>	<p><b>ELEMENT</b> Combination Level <b>Seating Element</b> A pre-designed and unified whole</p>	<p><b>UNIT</b> Component Level <b>Fence</b> Completed building component</p>	<p><b>MATERIAL</b> Piece Level <b>Natural Stone</b> Reshaped, compliant with fabrication</p>
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**Figure 1.** Developed by the authors with a reference to the Sweet's Production Matrix (McGraw Hill Information System Company, Sweet's Production Matrix 1971; Özkan, 1976:130).

the changes inflicted to the city as a whole. The city-wide requirements also extend to the historical environment and the renewed form directs the space designs. Those changes have also affected the appearance, silhouette, and identity of cities beyond architectural design (Hasol, 2011, p.2). Urban change is important for the conservation of historical fabric and the sustainability of cultural heritage in historical environments with architectural, archaeological, and monumental values (ICOMOS, 1987, p.2). The idea of preserving historical environments is generally accepted throughout the world, and despite the fact that governing laws and rules are in place, those laws are not sufficiently internalized and implemented.

International non-governmental organizations, including (UNESCO) and (ICOMOS), made suggestions with regard to conserving the historical environment. Nevertheless, the design criteria for the urban equipment intended for open areas often fail to consider harmony with and sensitivity to the historical environment and cultural heritage assets. This adversely affects the general appearance of the historical environment due to the dense installation of urban equipment elements. The expansion of cities throughout history and population increase are associated with intensive use of urban open spaces. New requirements have emerged upon aforementioned changes and developments in urban life. Urban furniture/equipment elements with multiple functions are introduced to accommodate the emergent requirements in the urban setting. Urban furniture/equipment can be defined as stationary equipment and fittings installed in the open areas of the city to serve a number of functions intended for all the urban

users (Akyol, 2006; Moughtin, Oc, Tiesdell, 1999, p.127). Today, those elements are a part of city with functional, social, and cultural significance for the urban life, and they are also necessary for historical environments with a view to facilitate social interaction between urban residents (Mantho, 2014, p.80; Peris-Ortiz, Álvarez-García, Rueda-Armengot, 2015, p.118). The said equipment is developed through industrial product design process to meet urban needs, and also referred to as city/urban furniture, landscape elements, street furniture, and city accessories among others. Furthermore, the equipment consists of objects from diverse categories of functions and uses, including lighting elements, outdoor furniture, infrastructure connection units, air conditioning equipment, separator systems, and floorings etc. In the present article, Sweet's Production matrix was used to combine those diverse categories under a single definition.

On the grounds that the majority of urban reinforcements (furniture, products, objects, items, modules, equipment and units) belonged to the combined category of elements, the "**Urban Equipment Elements**" term was used for the purposes of the study. Urban equipment elements are visual elements in relation to the culture and identity of the city and therefore the historical environment, in which they are located (Bayraktar, et al., 2008; Great Britain Department of the Environment, Transport and the Regions, 2000; Soares, 2016, p.420). Several classifications based on different aspects are available, which aim to better analyze urban equipment elements. Those classifications fall under four general titles of purpose, space, technical capability, and mobility (Aksu, 1998). Function is the main

determinative factor of the urban equipment element form. The function as Schürer and Gros used in their diagrams primarily consists of four components: social, individual, product, and environmental (Jaspersen, 1986). The environmental function includes the criterion of being in harmony with the historical environment.

Urban equipment elements are also used for different/multiple purposes in the urban setting. For example, lighting elements (path-area lighting) are also used for protection purposes. A variety of urban equipment includes but not limited to information boards (Billboards, clocks), points of shelter/accommodation; seating units for recreational purposes (benches, chairs, group seating elements); street signage for directional purposes; and kiosks (Vending Machines) for shopping purposes. Other purpose-oriented applications include the urban equipment placed for entertainment and game purposes (playgrounds and sports equipment), decoration purposes (pots, pools), cleaning purposes (garbage cans, ashtrays), communication purposes (telephone booths, mailboxes), and limiting purposes (Durmuş, 2008, p.11; Larice, Macdonald, 2013; Satiroglu, E., 2016; Ertaş, 2017). Therefore, urban equipment is defined on the basis of various types of functions. The urban equipment elements in widespread use in the public sphere by their functions include the following:

*Flooring elements:* flooring, covers, grids, natural and artificial stones or in situ produced floorings, special ramps, boundary stones, tree root concealers etc.

*Seating units:* benches, chairs, group seating elements etc.

*Lighting elements:* road lighting equipment, area lighting equipment.

*Signposts and information signs:* locators, advertising and information boards etc.

*Limiting elements:* deterrents, barriers, pedestrian-traffic barriers, limiters surrounding flower beds.

*Water elements:* decorative pools, fountains, pumps, canals, and fire hydrants etc.

*Top cover elements:* stations, shades, pergolas etc.

*Sales units:* kiosks, exhibition pavilions, kiosks, ticket vending machines etc.

*Artistic cultural objects:* sculptures, artistic and historical elements etc.

*Cleaning elements:* bins, public toilets.

*Stations/waiting elements:* public transportation stops, parking meters, bicycle parking lots etc.

*Landscape elements:* flora areas consisting of greeneries, planting, flower groups etc.

There are relevant classifications by different authors (Bulut, Yeğli, 2008; Derek Lovejoy Partnership, 1997, p.409; Kuşkun, Yılmaz, 2003; Kuter, Zeynep, 2019; Rubenstein, 1992, p.57; Şatir, Korkmaz, 2005; Yıldızcı, 2001, p.29;). It cannot be suggested that the urban equipment elements used in historical environments feature distinctive characteristics compared to other examples across the city in terms of required functions.

It is well-established that the urban equipment elements in the historical environment are utilized basically by three distinctive user categories. The first, i.e., the local user category, includes the residents of the relevant neighborhood and city and mostly the commercial business owners (tradesmen). The second user category includes the temporary users from other districts of the city, who make use of the area in question for transit purposes due to the fact that the said area is an urban hub. In addition, the temporary user category also includes the tourists visiting the historical environment, contribute to a multi-layered (heterogeneous) social construct therein. The employees constitute the third user type associated with urban equipment elements in the historical environment.

Urban equipment elements are classified into four main groups by the duration of use. First of all, the permanent use is that the city residents attend to certain foci in the outdoor space for certain periods of time. The aforementioned uses usually range from shopping activities to sitting, resting, and waiting. The second use is that the residents use the area while passing by on occasion. The transportation activities may be considered in the scope of the said use. The third use, or the functional use, is aimed to accommodate the outdoor needs of the residents. Accordingly, it is possible to refer to individual and social needs of the people living in the city. Public elements can perform multiple functions to meet a variety of multi-user purposes. Finally, there are auxiliary functional and aesthetic uses, including organization, maintenance, and security, which facilitate

the three groups of uses above (Asatekin, 2001, p.58-59; Bayraktar et al., 2008; Kuter, Erdoğan, 2009).

A similar classification can be applied for the duration of use of urban equipment elements inside the historical environment. Cities can be defined as a system of parts fed on the whole. Therefore, it is possible to classify urban equipment elements by the use of urban infrastructure. The infrastructure-dependent urban equipment elements include road and area lighting accessories, traffic lights, illuminated columns, square clocks, ticket vending machines, parking meters, infrastructure facility maintenance covers, grills, fountains, sales units, telephone booths, and bus stops among others. Whereas, the urban equipment elements, which do not rely on infrastructure, include temporary traffic lights, traffic signs, street signs, pedestrian barriers, canopies/shades, flagpoles/pikes, flower beds, routers, locators, deterrents, limiters, flooring elements, trash bins, seating elements, advertising-poster panels, and playground elements among others (Doğan, Erhan, Toka, Uysal, 1986).

'How a large city is formed' is a frequently visited question in the scope of urban sciences. Urban morphology is shaped by economic and social dynamics and technology as reflected in the production of urban space. In this case, a classification of urban equipment elements can be suggested based on materials and production methods. For the purposes of urban equipment elements, materials, which are resistant to environmental conditions (relative humidity, corrosion, climate, air flow, precipitation) and vandalism, which require minor maintenance, which are cost-effective and easy to produce, are preferred (Mainier et al., 2013; Ghorab, Caymaz, 2015). Urban equipment elements as elevated structures vary by building materials and components used in the floor. All urban reinforcements, except for a small number of species that are applied in situ, are mass produced in a factory setting and then installed in places as deemed appropriate. Factory productions vary by the selected material. Urban equipment elements are mass produced using natural stone, marble, granite, concrete, cast iron, stainless steel, cast aluminum, wood, and plastic injection only or with a combination of materials, including concrete-metal-wood, metal-wood, metal-glass, and plastic-metal (Main, Hannah,

2010, p.207-225; Şatir, Korkmaz, 2005). While natural materials, stones, glass, and metal are approved in historical places, the use of plastic in such places should be prohibited (Şatiroğlu, 2016, p.698). Albeit rare, materials in harmony with the historical fabric, are also used in the urban equipment elements in the historical environments. However, in case the design and production of urban equipment elements are independent of each other and of the fabric of historical environment they are intended for, this may create a harmony problem.

Mostly the in situ applied or fixed (stationary) assembly technique is used for the urban equipment elements (American Planning Association, 2006, p.292). However, there are also semi-mobile and mobile applications (Aksu, 1998). The quality of workmanship is of great importance during the in-situ application or installation phase of urban equipment elements. The incoherent design of urban equipment elements may have an adverse effect on the appearance of the historical environment, when the same is used concurrently with other elements. The layouts of the elements arranged in a visual harmony in urban design provide particularly remarkable and memorable images. The urban equipment elements as an attractive item of the city image also play an important role as regards the aesthetic dynamics. Urban equipment were elements that facilitated the personal and social life of citizens in the urban fabric, provided communication between individuals, had different quantities and qualities, and added functional and aesthetic meaning to spaces. Accordingly, they are of great importance not only for functional purposes, but also because of their vitalizing effects on the urban landscape. The elements that make up the identity of a city must be correctly identified and defined (Grove, Cresswell, 2013, p.125; Kong, do Rosário Monteiro, Neto, 2019). The natural environment, socio-cultural structure (historical environment features), and built environment should be considered and evaluated as a whole in determining the city identity (Önem, Kılınçarslan, 2005). Urban equipment elements are also used to make urban life comfortable, to make public space meaningful, and to create a sense of aesthetics (Şatiroğlu, 2016). It can be suggested that the urban equipment elements complement the urban identity and put a complexion thereon (Moughtin, Oc, Tiesdell, 1999, p.127; Soares, 2016, p.420; Van, Adams, 2012,

p.281). Urban equipment should be furnished in such a way that contributes to the socio-cultural characteristics of the users and not to the detriment historical features, if any. In this context, design principles such as “harmonious simplicity”, “ratio, rhythm”, “composition”, and “environment-oriented planning” should be regarded between urban equipment and the environment (Atabay, Pilehvarian, 2001, p.50-51). First of all, it is necessary to conserve the original or the original available, secondly, to synthesize historical qualities with modern lines, and thirdly, to enable people recognizing the historical landscapes before urban furniture by the use of transparent or semi-transparent units (Şatıroğlu, 2016).

The effect of urban change on the historical environment can be defined as “Heritage Open Space in Transformation” (HOST). A HOST should be considered in relation to: (a) its location; (b) size and shape; (c) surrounding impact; and (d) benefit and use. It should also be considered with a view to its contextual use: (a) socialization; (b) rest; (c) accessibility; (d) mobility; (e) heritage conservation; and (f) urban security. Historical environments (HOSTs), including squares, mosques, and museums are very important for the conservation of the heritage and for visits. However, they are considered targets vulnerable to terrorist attacks. Therefore, until recently, the security techniques as traditionally applied in public spaces often included military-class methods, such as barriers, fences, or flower pots, generally to the detriment of the attractiveness of spaces. Nevertheless, it is essential to adopt softer spatial interventions in order to make the elements that conserve the cultural heritage more secure but more attractive. It is possible to design urban equipment elements, which are in harmony with the aesthetic appearance of the environment and cultural heritage, and which have functions and locations that can help prevent possible attacks (Babalıs, 2022). In cities, technology, culture and the needs of city dwellers have changed drastically over time, and this change has also found its reflection on the developments in urban equipment element placed on the streets. The legacy Victorian lampposts are replaced by high-quality electric street lights and LED signs around the city display important news and daily weather conditions (miko, 2022; Xia, Yang, 2018). Here, it is essential to ensure optimization in harmony with the historical environment without

resisting the change. Facilitating the opportunity to visit historical environments has been proved to be effective in conserving the identity and physical values of monuments. Compatibility with the modern conditions and needs of the tourists is essential for revitalization of the historical environment and in the design of the urban equipment elements. The role of urban furniture may then be to convey, exhibit, and emphasize the particular concepts of historical artifacts. Accordingly, it may be preferable method to develop the aesthetic and semiotic indexes of the historical environment and to include them in the design process for the transfer of cultural assets (Barani, Shirvani, 2020).

Designs for a new building and urban equipment in a historical environment may not be based on the same perceptions. The new design either adapts to or contrasts with the environment or may replicate the existing forms in the environment. It should be ensured that urban furniture establishes a connection between the city and the citizen through certain design principles, including functionality, form, color, material, fabric, and aesthetics (Aksu, 2012, p.375). Urban equipment elements intended for historical places should be in harmony with the environmental identity through a holistic aesthetic perception based on form, color, fabric, and material. One of the important aesthetic features of urban equipment is coherence with people and the environment in which they are located. Accordingly, urban furniture in proportionally larger or smaller sizes compared to other elements with which they hold a visual relationship may fail to meet aesthetic standards (Seyrek, 1992). The harmony of the historical environment with the cultural identity of the urban equipment elements is important for preserving the uniqueness of the city in which they are located (Yıldırım, 2004). Urban equipment designs in the historical environment with no association with the environmental contexts, may create certain issues, including confusion and disorder in the historical fabric and trigger an identity crisis (Barani, Shirvani, 2020). Although in some cases harmony may be based on contrast, such furniture should not create visual pollution or incoherence. A site-specific design approach should be adopted. The design and selection of urban equipment elements in the historical environment requires a consideration of visual harmony (Shah, Kale, Patki, 2002). In addition to the designs that reflect the historical city, the use of nov-

el and modern designs indicative of cultural continuity would improve visual diversity and reflect cultural richness (Şatıroğlu, 2016).

Urban equipment elements are designed independently of each other based on certain factors including, function, aesthetics, and economy, in accordance with the currently accepted design approaches. It can be suggested that ur-

ban spaces interact with human behavior and thus remain alive (Kuloğlu, 2015). The characteristics of the historical environment should be considered in the design approaches of urban furnishings classified as per different criteria. The forms of urban equipment elements also affect their surroundings. Visual harmony should be ensured between the historical environment and urban equipment elements; in that regard the number of equipment ele-

**Table 1.** Main determinants of urban furniture design and applications in historical spaces (ACT, 2012; cheshirewestandchester.gov.uk, 2022; Güzel, Sözen 2003; Grosvenor's London Estate, 2011; Historic England, 2022; Maidstone Borough Council, 2022; Penn, 2007; Uslu, Ertürk, 2019, p.1851; Xia, Yang, 2018; Xia, Yang, 2018)

(Güzel, Sözen 2003)	(Penn, 2007)	(Uslu, Ertürk, 2019)	(Xia, Yang, 2018)
Determining the region's own traditional/spatial language	literal replication	Determining the historical and cultural values of the urban area	To be "human-oriented" and "demand-oriented"
To have a function that suits human use	invention within the same or a related style	Observation in the urban area and determining the existing urban elements	To reflect the regional characteristic culture, follow the cultural difference
Having a long-lasting structure that can stand for a long time	abstract reference	Determining the urban area where urban furniture will be placed	To improve the functions of facilities with technological means, and optimize the experience
Featuring a style that is able to convey a thought or experience	intentional opposition	List the deficiencies and seek solutions to replace these deficiencies,	To abide by the sustainable development design principle
Bearing elements that represent the features of the historical fabric		Form and function of urban furniture with respect to the problem and highlighting the identity of the urban area.	
Being original and impressive while having all these features			
(cheshirewestandchester.gov.uk, 2022)	(Historic England, 2022)	(Maidstone Borough Council, 2022)	(Grosvenor's London Estate, 2011)
Furniture should relate to and complement the function of buildings and spaces	Compile an inventory of historic Street furniture and its condition.	Particular regard will be paid to scale, height, materials, detailing, mass, bulk, articulation, and site coverage	Where possible-historic street furniture should be retained in-situ.
Combine elements of street furniture with signage, for example in order to minimise clutter	Encourage the preservation and maintenance of historic Street furniture	Create high quality public realm	Care must be taken to ensure replications are of high quality Issues of functionality must also be considered
Group street furniture elements together in zones away from heavy pedestrian flows and in parallel to the main direction of flow	Identify and conserve Street furniture that contributes to the area's significance	Provide a high-quality design, which responds to areas of heritage, townscape and landscape value	
(ACT Government, 2012)			
Original furniture should be retained and conserved in-situ	New furniture should be in harmony with its surroundings	Changes in furniture should be in accordance with the original.	Traffic signs should be kept to a minimum.
New furniture should be placed in harmony with the surrounding trees	New utility services should be incorporated along existing overhead routes or be routed underground in a manner that does not impact on built or major landscape elements.		



ments can be decreased. In environmental organizations, there are also time, meaning, and communication organizations along with space (Rapoport, 1977, p.15). Urban street furniture especially reflects the corporeal culture of the city as well as the degree of civilization and spiritual quality of the city. Every city needs a certain amount of urban furniture to achieve reciprocal integration and experience with the space. The penetration and integration of culture and technology into urban furnishings will help increase the sense of belonging and place of urban space and increase the attractiveness of the city (Xia, Yang, 2018). The increase in the experience of historical environments would in turn enhance and promote the cultural value, and that the urban equipment element may have a major contribution to the foregoing. Adopting of the principle of ensuring continuation of contemporary life is necessary to conserve the historical environment. The fact that urban equipment elements are designed and mass produced based on easy and fast assembly and replacement features without considering the historical characteristics of the environment in which they will be placed, makes it difficult to comply with the principle of being in harmony with historical environment.

## 2. Materials and Method

### Case Study Area

Cities with a deep-rooted past of 10,000 years back in history feature an intensive and diverse cultural accumulation (Güneş, 2013:3.4). The first settlement in Istanbul was in

Chalcedon (Kadıköy), subsequently, a Greek colony established on a hill dominating the Golden Horn and Marmara, in an area suitable for maritime trade, enjoyed the trade and topographic advantages, which contributed in the increased importance of the city that became a metropolis today. Indicated as the most hospitable and memorable places by the visitors to Istanbul, the top three destinations in Istanbul were the Bosphorus Strait, Sultan Ahmed Mosque (the Blue Mosque) (64.3%), and Hagia Sofia (76.7%) (Istanbul Directorate of Culture and Tourism 2016, p.19). The surroundings of Hagia Sophia and Sultan Ahmed Mosque located in the historical peninsula, a center of all the cultures lived on since the establishment of Istanbul, were selected with an aim to investigate the historical environment and urban equipment. Accordingly, the fieldwork on the said historical site, which was included in the UNESCO World Heritage List, would contribute to the solutions adopted in cultural centers of this variety across the world. The study was conducted in a special region with a number of cultural assets, including Sultan Ahmed Complex, the Hippodrome/Atmeydanı (with Serpent Column, Walled Obelisk, Obelisk of Theodosius, and German Fountain inter alia), the Museum of Turkish and Islamic Arts, Great Palace Ruins (Byzantine), Basilica Cistern, and routes to Topkapı Palace along with Hagia Sophia Mosque and Sultan Ahmed Mosque.



**Figure 1.** Hagia Sophia and Sultan Ahmed historical environment (İstanbul Büyükşehir Belediyesi, 2022) (improved by authors). (Latitude: 41° 0' 26" N Longitude: 28° 58' 41" E)

**Figure 2.** Hagia Sophia Square (Guillaume Berggren, 1870) (photographed by authors, 2021)

In Istanbul, spaces/squares were left in the circumference of religious structures, including Hagia Sophia Mosque and Sultan Ahmed Mosque. Those squares were utilized generally in an unplanned fashion throughout history. Until the 19th century, the fountain buildings and their front façades were the most frequently used locations inside the squares. Although there is a concept of urban square around these buildings, there are no urban furniture or equipment elements in support of urban life. Examples such as the Fountain of Sultan Ahmed III can be defined as the first type of structures intended for meeting the functional and aesthetic requirements of the unoccupied space inside the city (Kuban, 1998, p.157). Upon a review of the surveys conducted in the region, majority of the respondents reported that the city furniture failed to reflect the fabric of the city (Doğan, Altuncu 2021).

#### 1.1. Method of the Study











A literature review was conducted for the purposes of the study, covering the policy makers, decision makers, planners, officials, architects, and practitioners and professionals working on the relevant designs, who worked for or in a way related to the fields of architecture, urbanism, and urban furniture with regard to historical environment and cultural assets. There is a wide range of literature on theory and practice of conservation. The relevant articles of the international standards, principles, and bylaws from past to present were reviewed. Previous studies in the field of

contemporary architecture on the historical site in question were also reviewed and made use of. A literature review was conducted with a view to the definition of the urban equipment concept, urban furniture, and urban objects. Tables intended for the classification of the urban equipment used in the historical site and the relevant design criteria were developed for the purposes of the present study. The historical surroundings of Hagia Sophia/Sultan Ahmed Square were investigated on-site during 2021-2022 and the urban equipment captured by means of photography were assessed on the basis of classification and design criteria. Descriptive tables were developed for the results of the literature review and the criteria for urban equipment's function, settlement and harmony with historical surroundings in the historical site. The auxiliary criteria for the design of urban equipment intended for historical environment were reviewed.

### **3. An Assessment of Urban Equipment in the Historical Surroundings of Hagia Sophia - Sultan Ahmed Square**

Table 2 shows the classification of urban equipment designs by type of function based on the explorations and photography by the authors around the historical Hagia Sophia - Sultan Ahmed Square.

**Table 2.** An analysis of the urban equipment around Hagia Sophia - Sultan Ahmed Square based on the classification criteria developed as a result of literature review (improved by authors).

<p><b>CULTURAL HERITAGE OBJECTS</b>  <i>Monument, statue, historical elements, cultural assets, clock tower</i>                  There are Cultural Heritage Monuments/Objects, including obelisks and fountains in the Hippodrome site.</p>  <p>Obelisk of Theodosius, Snake column, German Fountain</p>	<p><b>FLOORING ELEMENTS</b>  <i>Concrete, stone, wood, asphalt, brick material, pavement, raised ground, crossings, curb</i>                  Frequent use of cut stones and/or cobblestones and use of pattern designs in the definition and coordination of the area for the purposes of cobblestone application with patterns forming grids at certain scales in the areas, with an aim to preserve the historical appearance and to be compatible with historical buildings/elements.</p>  <p>Cobblestone flooring</p>	
<p><b>FLOORING SYSTEM ELEMENTS</b>  <i>Loopholes, manholes – infrastructural covers</i></p>  <p>Die cast covers, which are adopted as a standard throughout the city, are used.</p>	<p><b>LANDSCAPE CONSERVATION ELEMENT</b>  <i>Flower pots, receptacles, tree trunks and floor protectors</i></p>  <p>No harmony between the use of elevated wooden plant frames, the function of the seating elements in the elevated sites, alternative elements with metal cutting grids aligned with the ground, and greenery elements and between the foregoing and the historical site.</p>	
<p><b>SEATING ELEMENTS</b>  <i>Table-chair, bench, group seating elements</i></p>  <p>Use of wooden boards with traditional die cast bearers and seating area in sequential alignment, where both mosques can be watched near to the Sultan Ahmet Mosque courtyard.</p>	<p><b>LIMITING ELEMENTS</b>  <i>Separator systems, deterrents, barriers, fences</i></p>  <p>Use of limiting urban equipment made of die cast and wrought-iron inspired by historical and cultural forms in the historical vicinity of Hagia Sophia-Sultan Ahmed Square.</p>	
<p><b>LIGHTING ELEMENTS</b>  <i>Road – area, facades, decorative lighting items</i></p>  <p>Classic-looking lighting posts with decorative items associated with historic sites.</p>	<p><b>TECHNICAL EQUIPMENT</b>  <i>Transformer, installation, safety, air conditioning equipment, fire hydrant, warning signs</i></p>  <p>Same designs with those in use across the city.</p>	<p><b>WASTE COLLECTION ELEMENTS</b>  <i>Trash bins, garbage containers</i></p>  <p>Same designs with those in use across the city.</p>
<p><b>WATER ELEMENT</b></p>  <p>There is a show pool with fountains in the middle of the historical area. They are operational historical fountains around Hagia Sophia - Sultan Ahmed Square. There are no modern service alternatives.</p>	<p><b>INFORMATION ELEMENT</b>  <i>Routers, locators, information boards, signboards</i></p>  <p>There are differences between totems with access from four sides in a form inspired by obelisk, auxiliary standard panels for additional information, transparent panels and warning panels.</p>	<p><b>TOILET MODULE</b> <i>Automatic or modular toilet units</i></p>  <p>There is only one single module to meet the toilet requirement around the historical area of Hagia Sophia - Sultan Ahmed Square.</p>
<p><b>TRANSPORTATION PARKING ELEMENT</b>  <i>Public transport stations, bike park, parking meter</i></p>  <p>Parking space is reserved for personal bicycle transportation around the historical Hagia Sophia - Sultan Ahmed Square. Electric scooters are also available.</p>	<p><b>COMMUNICATION ELEMENT</b>  <i>Tourism information kiosk, mailbox, phone booth, Wi-Fi coverage</i></p>  <p>Urban equipment designs used throughout the city for the purpose of communication are also in use around Hagia Sophia - Sultan Ahmed Square.</p>	<p><b>SALES MODULE</b>  <i>Kiosks, exhibition pavilions, buffets, souvenirs, stall booths, vending machines</i></p>  <p>Mobile units are more prevalent compared to immobile units in the historical vicinity of Hagia Sophia - Sultan Ahmed Square.</p>

**Table 3.** Comparison matrix (improved by authors) based on the characteristics of the urban equipment used in the historical vicinity of Hagia Sophia/Sultan Ahmed Square and the visual and experience relationship with the historical vicinity.

Genre Category	User Type			Duration Of Use			Infrastructure Use			Material					Assembly Technique			Harmony (H) vs. Contrast (C) Visual Association				Relationship of Experience with Historical Environment		
	Local	Visitor	Employee	Permanent	Temporary	Functional	Not Used	Water	Electrical	Stone	Concrete	Metal	Wood	Glass	Plastics	Immobile	Semi mobile	Mobile	Form	Color	Material	Texture	Yes	No
1	Cultural Heritage Objects		*				*			*						*			H	H	H	H	*	
2	Flooring Elements	*	*	*			*			*	*					*			H	H	H	H	*	
3	Flooring System Element			*		*		*	*		*					*			C	C	C	H		*
4	Landscape Conservation	*	*			*		*			*	*				*			C	H	C	C		*
5	Seating Elements	*	*		*		*			*	*	*				*	*		H	C	C	H		*
6	Limiting Elements	*	*	*			*				*		*			*			H	C	H	C		*
7	Lighting Elements	*	*			*		*	*		*		*			*			H	H	H	H	*	
8	Technical Equipment			*		*		*	*		*			*		*			C	C	C	C		*
9	Waste Collection Element	*	*		*		*			*	*			*	*	*	*		C	C	C	C		*
10	Information Element		*		*		*	*			*		*			*	*		H	H	C	C		*
11	Water Element		*		*			*	*	*	*			*	*	*			C	C	C	C		*
12	Transportation Parking E.	*	*		*		*				*					*			C	C	C	C		*
13	Communication Element	*	*		*			*	*		*		*	*	*	*			C	C	C	C		*
14	Sales Module	*	*		*		*	*	*		*	*	*	*	*	*	*		C	C	C	C		*
15	Toilet Module	*	*		*			*	*		*	*	*	*	*	*			C	C	C	C		*
16	Entertainment Elements	*	*		*		*				*	*	*	*	*	*			C	C	C	C		*

#### 4. Discussion of Urban Equipment in the Historical Vicinity of Hagia Sophia - Sultan Ahmed Square

All functional types of urban equipment are in use around the historical environment of Hagia Sophia - Sultan Ahmed Square. Majority of the equipment are identical with the standard designs preferred throughout the city.

An analysis of the urban equipment in the historical vicinity of Hagia Sophia/Sultan Ahmed Square by functional type indicated that differences in design criteria were required. Urban equipment was more prevalently used by the temporary user type (visitors), including tourists, compared to the locals and employees. Temporary users need more information about and a relationship of sense-making with equipment in common use. The duration of temporary use was longer compared to the permanent and functional uses. Although there was a number of equipment inde-

pendent from the infrastructure, there was a requirement for a more advanced design approach utilizing new energy technologies. Metal was the preferred material in the urban equipment. Similar use of stone, metal, and wood was effective as regards harmony with the buildings and artifacts in the historical vicinity. Notwithstanding above, new technology composite materials that can concurrently meet visual adaptation and change requirements should be taken into consideration. There was a tendency for using immobile (fixed) installations in the placement of urban equipment. Nevertheless, movable or flexible/mobile elements would be more effective in using the space and conserving the historical environment. It can be said that as long as the urban equipment around Hagia Sophia/Sultan Ahmed Square were in visual harmony with the historical environment, an experience relationship with the



users was also promoted. On the grounds that the experience of the historical region is important for the transfer of cultural heritage, the urban equipment could have been more extensively in the area in question. It is important to use form-color-material-fabric specific to the historical region, which is able to reflect the cultural heritage in order to establish visual harmony with the historical environment. Cultural heritage objects and flooring elements are generally a natural part of the historical environment. There was original experimentation intended for harmony with historical environment in the lighting elements, obelisk-form information elements, and wrought-iron limiting elements, which failed to ensure a sufficient impact. It is important to use original forms in harmony with the historical environment in the design of the equipment intended for the setting. Therefore, visual harmony and experience relationship can be established between the temporary users (tourists) and the historical environment, which would contribute in sustaining cultural heritage. There was no urban equipment associated with playground entertainment function in the historical site in question. Nevertheless, playground entertainment elements can be used very effectively to provide an experience of the historical vicinity.

As seen in Figure 3, the lighting provided by classical lighting poles with prominent decorative elements was inadequate around the historical vicinity of Hagia Sophia - Sultan Ahmet Square. Technical-looking additional lighting equipment was used to improve coverage and power of lighting. This led to visual disharmony between both the lighting elements and the historical environment. Even though the lighting equipment designed with an aim to ensure decorative harmony with the historical vicinity (classic lighting pole), the same, however, contributed to an eclectic appearance along with other equipment in the area. Lighting elements with decorative elements around the historical vicinity of Hagia Sophia - Sultan Ahmed Square failed to perform their function as visual adaptation to historical vicinity, despite their design priorities, due to extra lighting requirements or additional technical and communication equipment. Standard technical equipment were used to lighten the artifacts of cultural heritage.



**Figure 3.** Lighting elements around the historical vicinity of Hagia Sophia - Sultan Ahmed Square (photographed by authors)



Left: Fountain of Mehmed IV, Right: Osaka/Japan fountain

**Figure 4.** Compatibility of fountain, the urban equipment, with historical environmental experience (photographed by authors)

Fountain of Mehmed IV, a cultural heritage, serves the function of water element around Hagia Sophia-Sultan Ahmed Square. Nevertheless, there are no contemporary fountains in the historical vicinity. Providing an experience of historical environment by means of visual harmony is necessary for the sustainability of cultural heritage. Addition of urban equipment in the form of fountains would be effective with a view to provide an experience of harmony with history, culture, and environment.

**Table 4.** Functional distribution of urban equipment used in the historical vicinity of Hagia Sophia/Sultan Ahmed Square (improved by authors).

Genre Category		↓	↻	●	⊕	⌘	↓		↑	⊕	⌘	⊕	⌘	⊕	⌘	⊕	⌘	⊕	⌘	⊕	⌘	⊕	⌘	⊕	⌘	⊕	⌘	⊕	⌘	⊕	⌘	Number of functions that can be added	
↓	Cultural Heritage Objects						•					•																				02	
↻	Flooring Elements			•	•		•	•			•	•	•																			08	
●	Flooring System Elements			•	•	•		•	•		•																					06	
⊕	Landscape Conservation Elements						•	•	•		•		•																			06	
⌘	Seating Elements				•		•	•			•		•	•	•																	08	
↓	Limiting Elements			•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	13
	Lighting Elements			•			•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		10
⊕	Technical Equipment																															00	
⊕	Waste Collection Element			•			•	•			•											•	•									06	
⊕	Information Element			•	•	•	•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		13
⌘	Water Element			•		•		•																								04	
⊕	Transportation Parking Element			•		•	•	•	•		•												•										07
⊕	Communication Element						•	•	•		•		•		•								•										06
⊕	Sales Module						•	•	•		•	•		•	•																		07
⊕	Toilet Module						•			•		•	•	•																			05
⊕	Entertainment Elements			•			•	•	•		•		•	•	•																		07

There are certain designs which incorporated a number of functions of urban equipment into one single product. Reducing the number of installed equipment may contribute to visual harmony with historical environment. Furthermore, a comparatively small number of equipment, which can accommodate multiple requirements would also reduce the assembly procedures undertaken in the historical environment. There are different types of urban equipment intended for each requirement, as can be seen in the types categories listed in Table 4. Therefore, an urban equipment design approach, which would incorporate similar-complementary functions in a relatively small number of equipment, can be preferred in projects specific to historical environments. The design of information and limiting elements allows sharing functions with a majority of other types of equipment. And thus, common designs in which certain function groups are combined can be in-

troduced. Concurrently, most equipment can function as a limiting element, when installed in the historical environment. Lighting elements can also provide many functions of urban equipment. Although technical equipment is not recommended for the purposes of functional share, visual harmony should be considered in the design thereof.





**Figure 5.** Examples of urban equipment with combinations of various functions around the world, from left to right Berlin, Venice, Karlsruhe, Malaga, Sevilla, Munich (photographed by authors)

Design examples incorporating various functions can be used in historical environments. In the case of Berlin, the seating element, which has a mobile feature, meets the information function along with providing a flexible space for use.” In the case of Venice, the flooring elements provide a harmonious visual complement to the landscape conservation element and the seating element functions. The flooring elements in the Karlsruhe example can be used more effectively for the information function. In the example of Sevilla, there is a harmony between the flooring element and the flooring. The Malaga example is characterized by incorporation of limiting and landscape conservation functions. The informative element design for the location and area sketch in the Munich example can be given as an example of harmony with the historical vicinity.

## 5. Conclusion

The principles of conservation of the historical environment and respect for cultural assets are also suggested by authorities and the relevant literature. It was emphasized that within the scope of the urban built environment the historical environment is also surrounded by urban equipment and those products collectively contribute to an effective whole. As a result of the increasing population in metropolitan areas, the city is more intensively used by its inhabitants. This suggests the increased value of the urban equipment. Historical environments are one of the most cosmopolitan regions thanks to the contribution of tourism activities as well as the demographic human diversity in the metropolis. Although the conservation of historical environments is supported by reputable institutions, including ICOMOS and UNESCO, and there are a number of relevant studies, the designing urban equipment without considering the characteristics of the historical environment, their mass production, diversity, and rapid change complicates the efforts to check their harmony with the historical environment.

Historical environments are also touristic destinations, and therefore, there is a higher rate of circulation of temporary visitors. Therefore, urban equipment in the historical environment should contain more information by design and should be easy to understand. Infrastructure-independent solutions are preferred. New technology materials can be considered with an aim to meet the requirements of visual harmony with the historical environment and change. The opt for flexible/mobile urban equipment would be more effective in terms of use of space and the conservation of historical environment. Experiencing the historical environment is important for the transfer of cultural heritage. Urban elements which ensure visual harmony relationship with their historical environment allows users to experience the historical environment and share cultural heritage. Even if the urban equipment elements in the historical environment are designed in harmony with the historical environment, they can create a complex contrast with other equipment in the same area. Therefore, the equipment intended for use in the historical environment should be designed with an original approach that includes attributes, which are in harmony with the historical environment. In addition, reducing the amount of equipment in the historical environment can prevent the chaotic appearance. Therefore, combination of functions and the joint design of the equipment elements can prove to be a part of the solution. In particular, limiting, information, and lighting elements can be designed with an aim to accommodate other functions. In conclusion, urban equipment elements in historical environments should have a consistent design across the setting and feature an original appearance in harmony with cultural heritage. In this way, such equipment would contribute in the experience of the historical environment and the sharing and transfer of culture. In addition, incorporating multiple functions in urban equipment may help with decreasing visual chaos in the historical environment and contribute to visual harmony.

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## Investigating the Relationship Between Water Element Designs and User Preferences

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### Abstract

Water elements are design features that complement the environmental landscape with their natural and artificial appearance, particularly in urban spaces. They are effective in boosting the quality of urban space by supporting perceived and real comfort in the area where they are found. In this study, a face-to-face interview photographic survey was conducted with 500 people chosen randomly in five different city squares in Istanbul, whereas participants were asked why they preferred particular water element forms, such as; (natural / geometric form, still / moving form, light / dark colored ground, angular / curvilinear form, natural / colored light). According to the results of the survey conducted, answers provided were grouped under the headings of 'no reason,' 'physical feature,' 'psychological effect,' 'aesthetic appearance,' 'nature conservation,' 'modern' and 'cleaning.' As a result of the research, it was observed that water elements with natural forms were preferred over those with geometric forms, water elements with light colored floors were preferred over those with dark floors, and water elements illuminated with natural light were preferred over those illuminated with colored light. While physical appearance, psychological effect and aesthetic features of the water elements are the primary factors in the preference of the water element, it was determined that definitions such as cleanliness, nature conservation and modern appearance are not as influential compared to other selection factors.

### Keywords:

water element, form, design, landscape perception, color, lighting

### 1. Introduction

According to White's (1980) book entitled *The Social life of Small Urban Spaces*, water, together with the sun, trees, food and seating groups, is shown to be amongst the important elements that invariably need to be found in urban open spaces. Landscape theories and research emphasize that human water elements are an important comfort component within the physical environment elements (Ren, Kang 2015; Karr, 1992; McCulley 1976; Moore, Lidz, 1994; Ulrich, 1999). When the studies are evaluated in terms of visual landscape quality, it shows that there

are positive correlations between water elements and their preference (Herzog, Barnes, 1999; Polat, Akay, 2015; Purcell et al., 1994). As a result of the studies of Chai, Wengven and Lin (2022), water was deemed considerably higher than other landscape factors, indicating that water had the utmost positive impact on landscaping preference. Water has historically been an important part of gardens and public spaces (Lehrman, 1980; Burmil et al., 1999; Dalley, 1993). Water elements can be described as visual elements in the in-situ environment, when they are considered to balance the arid air in the aquatic environment with the effect of concretion, to vitalize the stability in the



environment, to make people feel good psychologically and aesthetically (Perysinaki, 2010). In designing water elements to be utilized in urban spaces, the function, structural structure and appearance of the water needs to be taken into consideration (Littlewood, 2012). The character of the water in that space has a direct impact on the character of the space and human activity. In urban open spaces, water can originate from a point source, flow from a linear surface, collected in an enclosed form or take on the setting of a boundary element. In their studies, Hami and Emami (2015) state that watery scenery has a stimulating effect on people and break the monotony of the landscape. Some researchers also point out that water has a regenerative effect on people (Francis, 2003; Hartig, Mang, Evans, 1991).

Water elements are set in different forms and shapes in their living environment. Dr. Maslow (1998) indicated that individuals' preferences while choosing a water element are form, simplicity, non-artificial and easy access, scale, integrity of the entire design and the presence of sub-regions; the balance of pliable and hard ground with the material accommodating a multitude of textures; water sound, noise suppression and audible; whereas the presentation qualities of water are broken down into the following headings; reflection, illumination, open appearance, mobility and appealing to more than one sense. Enlivened by sprinklers, illuminated with colorful lights, they can be given natural and informal forms as well as incorporated into formal structures. They can be arranged into various sizes and shapes according to the function, form and dimensions of their *in-situ* space (Erdem, 1995). Hensey (2019) wrote, "Water can be simple and complex, smooth and rough, transparent and almost opaque, quiet and noisy." On the other hand, Booth (1983) emphasized water's physical, emotional and metaphorical appeal, which is calming, exciting, remarkable, as well as prompting.

The forms created can be used in the form of a natural water element, directly imitating nature, with factors such as the use of natural materials, the natural flow of water in the direction of gravity, etc., or it can also create a natural lakeside effect, for example, with the line softened by making the shape curvilinear based on geometric

shapes. The geometric shape deformed in this way can leave the central focus to create an *in-situ* natural effect. Compared to geometric water elements, a larger area is needed for water elements designed by deforming their geometric shape (Brookes, 1991: 244). Cendere grouped the perception of water (1998) beneath five headings such as, "visual, auditory, psychological, tactile and refreshing."

Water elements are divided into two groups as still and flowing waters. Still water elements are one of the design elements frequently used in many fields such as parks, gardens, housing estates, shopping malls, etc. The selection criteria may vary depending on the area of use. Designs using still water have a reflective effect. Despite being a liquid, water can look like glass material when used in still form. Likewise, a design using glass material can create a water effect. This may be one of the reasons that affect the preferences of people within the environment. The research results of Özer and Barış (2012) showed that the majority of users, except the 61-65 age group, prefer moving waters such as flowing, fountain pools and waterfalls. Harris and Dines (1998) also stated that still water, which can create a reflective, calm effect in the design of the water element, conveys aesthetic value, while expressing that it has an attractive feature on people with its humidity and its cool feeling. They emphasized that the use of still water often creates fertile space for people to gather in public places.

Moving water can also be grouped into two groups. This is water under the influence of gravity, that is, natural and artificial elements such as water curtains, streams, cascades and waterfalls flowing downwards, and fountains, fountains that can be directed or released by various movements in the opposite direction of gravity with the effect of pressure. When water elements, which have a remarkable *in-situ* feature, are chosen as flowing, they can be affective in emphasizing the space and attracting people with a sense of curiosity, since they can create a sound effect. When designed together with many factors to be used in design such as sculpture, audio-visual, planting, etc., sound is a factor that can have a psychological effect on people, thus boosting the efficiency of people's

five senses by supporting visual perception (Gencturk, 2006). Moving water elements may produce less bacteria, odor and pollution than still water. Some researchers also draw attention to water's psychological healing effect. For this reason, seeing that water can renew itself, it arouses the feeling of "cleanliness" with its sound and appearance, from both a psychological and physical standpoint. (Mroczek et al., 2005)

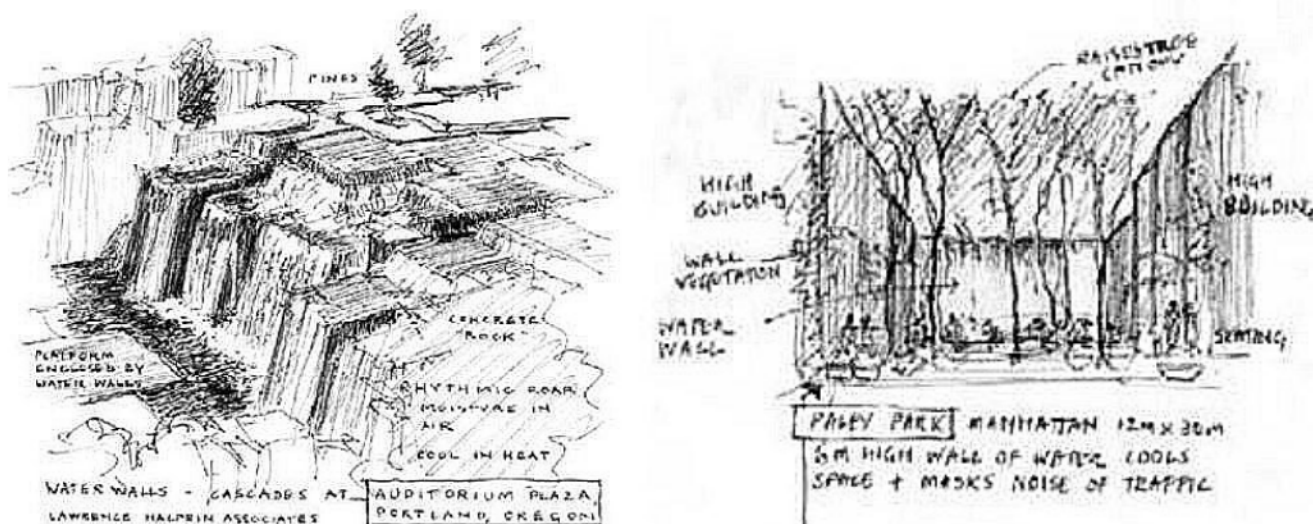
Decent quality water gets its clean appearance and color from the surface reflections, its character and the color of its container. While white or reflective containers express the water's transparency, light blue containers emphasize the water's cleanliness and clarity and dark blue or black containers maximize reflection while providing a wetter appearance.

Flat and plain during the daytime, the water surface will take on a different appearance with reflections and refractions caused by nighttime illumination. The loss of light-shadow balance in the areas that are desired to be emphasized in over-illuminated water elements may pre-

vent realization of the targeted effect. Likewise, lighting elements containing too many colors can tire the viewer's eyes and make them difficult to perceive.






## 2. Method

In 2018, a survey was prepared in order to test visual preference judgements and opinions of perceived water features. To obtain a homogenous and reliable result, 500 people were selected for interviews through a cluster procedure conducted at five different urban squares around Istanbul (Bakırköy, Ortaköy, Kadıköy, Şirinevler and Taksim). The questionnaire included adjective pairs for each component. Participants were told there were no right or wrong answers and were asked to rate each scene on a scale of 1 - 10. The reasons why users prefer water elements were asked open-ended. First, all the answers were listed, then they were listed under the headings of 'physical appearance,' 'psychological effect,' 'aesthetic appearance,' 'nature conservation,' 'modern' and 'other,' whereby the percentages of preference were examined in the SPSS environment.



**Figure 1.** Left: Paley Park, Manhattan (12 x 30 m); Right: Water walls-cascades by Lawrence Halprin and Associates, Auditorium Plaza, Portland, Oregon, Water elements from the Dee drawings (2004)

**Table 1.** Water feature preferences (N=500) (improved by authors)

	N	%
<b>NATURAL OR GEOMETRIC FORM</b>		
		
Dockside Green Community (Vancouver Island, Ellen Moorhouse, Toronto Star)	Robert and Arlene Kogod Courtyard (Smithsonian American Art Museum, Washington, D.C.)	
Natural	349	70
Geometric	151	30
<b>STILL OR MOVING FORM</b>		
		
Tanner Springs (Atelier Dreiset, Fred Jala/Flickr)	Fort Worth Water Garden, Texas	
Still	216	43
Moving	284	57
<b>DARK COLOR / LIGHT COLOR</b>		
Dark color	198	40
Light color	302	60
<b>ANGULAR / CURVILINEAR</b>		
		
Château de Vaux-le-Vicomte Gardens (Maincy, France). Image © Mark B. Schlemmer/Flickr		
Curvilinear	286	57
Angular	214	43
<b>NATURAL OR COLORIZED LIGHT</b>		
Natural light	193	39
Colorized light	307	61

\*Photos from Terrapin Bright Green (2014)

### 3. Research Findings

As a result of the research, it was determined that natural-form water elements were preferred to geometric ones, light-colored water elements were preferred to dark-colored water elements, and water elements illuminated by natural light were preferred to those illuminated with colored light. It was also determined that the preference rates for the 'still-flowing' and 'angular-curvilinear' elements were close to one another (Table 1).

The majority of those who preferred natural-looking water elements prefer the water element due to its physical appearance (34%) and its psychological effect (23%), whereas it was determined those who prefer geometric forms prefer water due to its aesthetic appearance as well as its physical appearance. It was determined that 13% of those who preferred the natural water element stated the effect conserved nature; it was also determined those who chose the geometric form indicated that conservation wasn't a factor. Again, while some of those who chose the geometric view (10%) found the water element modern, it was also observed that those who chose the natural form didn't consider the water element a modern feature. The

majority of users chose still / moving water due to its psychological effect (42%), whereas moving water was more aesthetic than still water. Once again, it was determined that moving water was cleaner than still water (Table 2)

While the majority of users who chose the dark color element did so as they considered them aesthetic (35%), the vast majority of those who chose a light-colored floor did so because of its psychological impact. It was determined that the cleaning factor had a slight impact in selecting either floor. While it was determined that the majority of those who chose the curvilinear / angular form preferred the angular form due to its physical appearance (36%) and aesthetic appearance (30%), whereas it was observed the physical and aesthetic appearance were of equal value in the selection of the curvilinear form (31-31%). It was also determined there were users who chose curvilinear and angular forms, describing these forms as modern. Moreover, it was determined that those who preferred natural light to illuminate also stated that the water element affected their choice of physical appearance (31%) and psychological effect (28%). It was observed that those who chose colored light preferred water for its aesthetic properties (30%) rather than for its psychological effect.

**Table 2. Factors affecting water element preferences (improved by authors)**

	Natural Appearance		Geometric Appearance		Still Water		Moveable Water		Dark Color		Light Color		Curvilinear Form		Angular Form		Natural Light		Colored Light	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
1	59	17	27	18	45	21	53	19	36	18	47	16	56	20	43	20	60	20	41	21
2	119	34	46	30	49	23	53	19	46	24	54	18	90	31	76	36	96	31	50	26
3	82	23	22	15	91	42	101	35	36	18	142	47	38	13	21	10	85	28	45	23
4	44	13	41	27	31	14	66	23	69	35	43	14	89	31	65	30	66	21	57	30
5	45	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	15	10	-	-	-	-	-	-	-	-	13	5	9	4	-	-	-	-
7	-	-	-	-	-	-	11	4	11	5	16	5	-	-	-	-	-	-	-	-
Total	349	100	151	100	216	100	284	100	198	100	302	100	286	100	214	100	307	100	193	100

N: Number

1.No reason 2.Physical appearance 3.Psychological impact 4.Aesthetic appearance 5.Eco-friendly 6.Modern 7. Cleanliness

#### 4. Discussion

The appeal and perception of open water bodies seemed to be significantly dependent on their appearance (Donaldi 2018). Research conducted has demonstrated that water has a strong impact on environmental perception, beneficial physical, psychological and physiological effects of spaces containing water and potentially meeting restorative health needs (Korpela et al., 2002; Sakıcı, 2015, Zube et al, 1983; Ulrich, 1983; Ulrich, Simmons, 1986). Common factors were also encountered in the survey applied in the method of this study. These findings are detailed in the Discussion section.

In a study in which nine water elements in a park were examined by Elinç, Elinç and Kaya (2012), the low cooling (psychological) effect of the geometrical still water element was similar to the results of this study. Again in this study, the fact that the natural look was preferred more than the geometric look supports the results of the Donald (2018) and Elinç et al. studies.

According to the data collected by Kürkçüoğlu (2009) from a survey of 50 people regarding a flowing water element in a public square, 82% of the users preferred the moving water element, while 18% stated they chose the still water element. Moreover, in the study in which aesthetic perception was also questioned, it was determined that the majority of users regarded moving water as more aesthetic. In addition, the impact of still / moving water on human psychology was also observed in the Kürkçüoğlu study. In comparing the psychological and aesthetic expectations of the users' responses, it was determined that while expectations of the water element from a relaxation standpoint were 28.15%, the expectation of aesthetics, that is, visuality, ranked second (25.33%). While the results of the Kürkçüoğlu study indicated there were significant differences in the choice between still and moving water, the percentage of people choosing still and moving water in this study were close. That said, flowing water elements were the most preferred group in the Cendere study (1998). The cleaning factor was also found in the replies compiled from the questions regarding the matter of still / moving water within the scope of this study. While no cleaning response was obtained for still water, the result was 4% for flowing water. Burmill et al. (1999) also pointed

out the perception of cleanliness of water. In this study, a result that bolstered Burmill's determination was obtained by specifying the perception of cleanliness as the reason for choosing still over flowing water or vice-versa.

While the floor coating to be used in water elements plays an important role in factors such as spending time around the water element, drawing attracting to itself, and emphasizing the importance and quality of the space, in his investigations on water elements in various urban spaces Erdal (2003) revealed the reflective feature of the floor material used in dark colors acted as a mirror. It was also perceived that a dark-colored water element used in a touristic square affects the preference of visitors as it reflects the surrounding historical structures onto the water. On the other hand, it was emphasized that light-colored water elements evoke the perception of cleanliness. The results of this study showed that light color was preferred because of its psychological impact rather than the cleaning factor. Erdal (2003) emphasized that as the floor color becomes lighter and used in a light color, the water changes from reflectivity to a showcase function, and thus people will focus on the floor covering and the items to be contained within, and not the reflecting structures. Therefore, since the use of light and dark colors affects human perception, it may be concluded that the psychological impact is higher than other groupings. While Erdal's (2003) study in dark color preference underscored increasing human perception by including aesthetic concerns with light colors, dark colors were found to be more aesthetic in this study. In yet another study, it was noted that light color (blue) floor covering used in the water elements was clean and spacious by half of the users, while the others found this color too classic and that different colors needed to be chosen. Contrary to the concept of classicism, it can be understood that users sought contemporariness in the color of water elements with a myriad of color preference expressions (Kürkçüoğlu, 2009). That said, contemporariness wasn't found as one of the factors in the results of this study.

Many studies draw attention to the fact that curvilinear water forms are much more preferred than angular water forms. In one such study, Gençtürk (2006), stated that a circular pool with a fountain is generally aesthetic and well-maintained by users, and embodied an artificial ap-

pearance rather than a natural one. Moreover, it was stated that in the data collected pertaining to the angular water element, it was less aesthetic than the curvilinear pool, whereas an artificial image response was garnered. As for the curvilinear / angular form aspect in this study, physical and aesthetic image factors come to the fore, whereas the physical image factor regarding curvilinear versus angular forms was nearly equal. (%31-%36) As for the aesthetic look, values for the water element for both forms were equal (31%-30%). The results of this study support Gençtürk's findings. In making the water more natural and attractive, the results of the studies of both Cendere (1998) and Kürkçüoğlu (2009) underscored the presence of vegetation and fish, as well as illumination.

## 5. Conclusion

As a result of this research, it was determined that natural-form water elements were preferred over geometric elements, light-colored water elements were preferred over darker-colored ones, and water elements illuminated with natural light were preferred over those illuminated with colored light, whereas primary factors for their preference were; physical appearance, psychological effect as well as aesthetic features of the water elements in question. Moreover, it was also determined that the definitions of cleanliness, nature conservation and modern appearance were not preferred according to other selection factors.

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## A Study Of Parklet Planning, Design And Planting Criteria Examples In Izmir And Istanbul

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### Abstract

The objective of this study is to research the planning, design, planting and maintenance requirements of a quality parklet by means of the examples of Izmir and Istanbul parklets in Turkey. In this regard, planning and design (important elements=wheel stops, flexible posts, raised platform/recommended elements=open guarded-railing, the sub-structure/urban furniture=flooring, seating, lighting, bicycle stands, shades, art, signage), as well as planting and maintenance were tested on two example parklets with a checklist created using on-site detection, photography and observation methods. As a result of the research in question, it was concluded that the use of reflective surfaces and wheel stoppers critical for safe usage are insufficient in parklet designs; that vertical elements don't meet the minimum usage standard; that there are no lighting, trash, art and game elements in neither area; and that it was determined the Istanbul parklet example was insufficient in terms of shade and planting compared to the Izmir example.

### Keywords

parklets; design-build; community, urban interior; Istanbul, Izmir

### 1. Introduction

As an example of tactical urbanism initiated by Rebar in San Francisco in 2005, PARK(ing) offers a social and spatial innovation in the form of temporary, one-day installations that aims to expand the social life and the pedestrian area of the pavement by transforming parking lots into seating areas, continues to be utilized in different parts of the world with various purposes and scales. (Bermúdez, Traunmueller, 2019) Brozen, Loukaitou-Sideris, 2013; Hou, Spencer, Way, Yocom, 2014). What originally started off as a guerrilla movement built over transience, Park Day began to be transformed into a permanent form in 2010, with arrangements made by the local government in San Francisco and support programs such as 'From Pavements to Parks.' Taking an innovative tack in the form and function of public spaces, they provide opportunities for collaboration between local government, businesses, customers, designers and residents living in the vicinity (De Lange, & De Waal, 2019, Gould, 2012; Jackson, 2020). The results of

a study conducted in Baltimore and Long Beach indicated that parklets around cafes and restaurants increased revenue of surrounding shops by 20% (Kenny et al., 2020).

As researchers have pointed out, parklets improve the comfort of their environment and the quality of urban life (Birdsall, 2013; Ghandi, 2019; Ocubillo, 2012; Owens, 2018; Smith, 2016; Southworth, 2014; Young, 2018). While increasing pedestrian movement on the street (New York City Dep't. of Transportation, 2011; Pratt, 2011) and people's face-to-face interaction, they also provide opportunities for interaction with their environment (Ghandi, 2019; Perkins+Will Consulting Team, 2013; Southworth, 2014). Created by widening the pavement, parklets are designed to replace one to three car parking spaces, and include activities such as sitting, talking, eating, reading, parking one's bike or observing the surroundings (Loukaitou-Sideris et al., 2013; Sasaki, 2018). As with Seattle's parklets (Bela, 2021), they can be used for commercial purposes

during business hours and then be opened to the public. In site selections, it is recommended that the risk of being hit by a motorized vehicle is low, they are far from intersections and street corners, and they are installed on streets with speed limits of 40 kilometers or less (NACTO, 2013; Watson, PTP, 2014). Quality parklet design components may be listed as crucial elements (wheel stops, flexible posts, raised platforms), recommended elements (open guarded-railing, sub-structure), urban furniture (flooring, seating, lighting, bicycle stands, shades, art, signage) as well as vegetation (Corey, 2014).

As an extension of the sidewalk, parklets can create additional pedestrian traffic or aid pedestrian flow, creating a new public space for assembly (Dai, 2012). In order to help protect against moving traffic and parked cars, parklets in parallel parking spaces should be buffered using a wheel stops 1.2m from parked cars and 91cm from the curb edge. Wheel stops should be 91 cm long, black rubber material with yellow stripes should be used, and be mounted with bolts. Parklets need to be clearly defined with either vertical pole-like that make them visible to traffic, or else with flexible poles, both with retro-reflective tape. They should be placed at a distance of 60cm from the edge in both directions of the parklet (Figure 1).

Railings mark the boundary between the parklet and the avenue or sidewalk. They can feature planters, rails, cabling, or some other appropriate enclosures to increase durability against drops and pushes. The rail gaps must hinder passage of a 10.16-cm sphere. The height from the parklet platform base to the top of the guardrail shouldn't exceed 91 cm. All guardrails/guards should have retro-reflective reflectors or retro-reflective tape at the corners of the parkway facing the travel lane, visible to vehicular traffic at night (NACTO, 2013). Sub-structure designs will vary depending on the general design of their structures and the slope of the street. Appropriate ground should be provided with 'bison pedestals' or a steel sub-structure and angled beams (Kaufman, 2015).

Parklets have the potential to improve street spaces, providing permanent seating, vegetation, connection to bicycle networks and bicycle parking spaces in their design will boost their success (Lavine, 2012; Littke, 2016). The platform surface should be installed with a permeable, high quality floor covering.

Finishing materials should be wood, composite or brick. Tiles, rugs, artificial turf shouldn't be allowed. Also, loose particles such as sand or loose stone are not allowed in



Vertical elements, San Francisco, CA, Credit: Nelson\Nygaard



Min width of 1.82 m, New York, NY, Credit: NYC DOT



A flush transition at the sidewalk and curb San Francisco, CA, Credit: Nelson\Nygaard



Incorporate seating, Oakland, CA, Credit: Oakland DPW

**Figure 1.** Parklet design details (NACTO, 2013)

the parklet and surfaces should be non-slip. The seat must be provided either as movable furniture or as integral elements in the structure of the parklet. The results of Dai's (2012) study show that crowded pedestrian activity and nearby traffic attract people, and the use of parklets with seating and table areas is preferred. 5% of the seating areas should be suitable for disabled use. Undoubtedly, the choice of open, visible and street lighting in the immediate vicinity for the parklets will boost safety at night (Loukaitou-sideris et al., 2012). Lighting should be aimed away from the road so as not to prevent the risk of glare for vehicles. Light strips should be hung to allow a minimum clearance of 254mm above the pavement and parklet platform. Bicycle parking spaces; can be included in the parklet in various ways; Wherever deemed appropriate, meter heads can be replaced with meter hangers. For sites with a concrete roadbed, standard inverted U-shaped bike racks can be mounted on the roadbed adjacent to the parklet. As for shading, they should be made of fire resistant material and 2m from the platform. For a Parklet, if umbrellas are to be recommended, they will be the center posted and not exceed 1.8m by 1.8m with a vertical span of 2m. Ensuring air protection around the parklet seating will render use of the space comfortable throughout the year. Weather protection can be provided with mounted or movable canopies, umbrellas and awnings. Art elements can create identity while increasing the charm of parklets. While the artefacts can be permanent, their temporary placement can also be made. Some art, depending on size, design, and placement, may require additional review. Signs are allowed provided the sign area does not exceed 61cm x 91cm. Illuminated markings are not recommended. If the parklet is intended to serve the general public, it must be identified by labelling signage. Outdoor heaters and elements that use gas or propane fuel will deem parks usable year-round. It's important for parklets to appeal to all age groups. Playing elements can be used in parklets, especially for children (and adults) to spend time. Play tools can be toys, games and swings. These apparatus can be mounted or movable within the parklet structure.

The planting design around the parklet will act as a buffer along the street-side facade while promoting the use of space (Weglarz, 2018). Landscape elements can include plant pots, hanging baskets, green walls as well as eleva-

ted plants. In taking the maintenance issue into account, it would be good to prefer drought-tolerant and native plants. Due to their texture and seasonal effects, the use of edible or fragrant plants will inevitably increase the quality of herbal design. The aim of this study is to assess the parklet uses in the Turkish cities of Istanbul and Izmir by examining the issues of parklet planning, design, planting and maintenance.

## 2. Materials And Method

### 2.1. Methods of the study

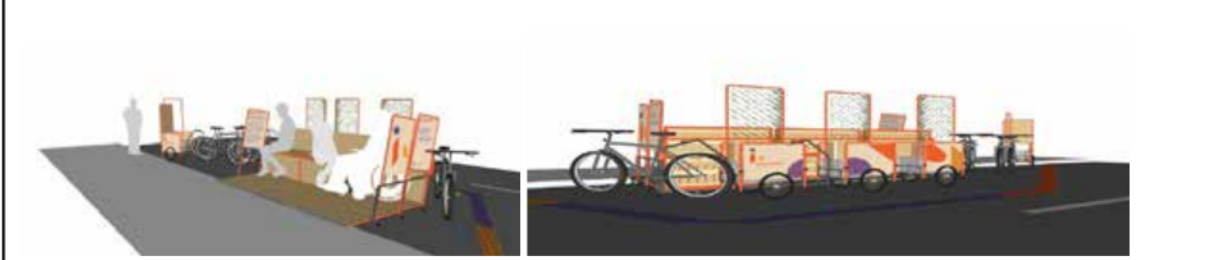


Which physical characteristics should be included for a successful parklet were investigated in the study. Since the Istanbul example was temporarily established and is currently unavailable, an on-site determination study was conducted through photographs taken of the unit which was first installed in Üsküdar and then by travelling to the area it was subsequently placed. On the other hand, the Izmir example was analyzed by on-site detection, observation and photographing methods in May 2022.

### 2.2. Research areas

Parklets installed in different parts of the world are not commonly used in Turkey. There are only two parklet examples in Turkey which were not introduced until 2021. One was in Istanbul, the other was in Izmir. The parklet model in Istanbul was temporary, and was displayed along Hakimiyet-i Milliye Avenue in the district of Üsküdar on 16 September, to mark the start of 'European Mobility Week 2021,' then it was moved to the European side of the city, to İhlamurdere Ave. in the Beşiktaş district between 18-19 September, then to Halaskargazi Ave. in the Şişli district on 20-21 September, and finally the Abdi İpekçi Ave. in the Şişli district on Wednesday, 22 September (WRI, 2021). In terms of total area, the Istanbul parklet was smaller, with just wrapping plants in its vegetation design, in addition to the seating and bike tie-up spots. The Izmir parklet is at a permanent location and is comprised of two modules, each covering an area of 5 x 2.5 meters. One of these three 'pocket' parks features a mini playground for children, another has a canopy and table, while the other features a bike tie-up spot. Its vegetation design includes tree species such as; *Iris ensata*, *Viola odorata*, *Lonicera nitida*, *Platanus orientalis* tetto, *Rosmarinus officinalis prostra-*



**Table 1.** Descriptions of the Istanbul and Izmir Parklets (WRI, 2021; UrbanGreenUP, 2022)

	Istanbul Parklet <b>Example</b>	Izmir Parklet <b>Example</b>
<b>Location</b>	Üsküdar district Hakimiyet-i Milliye Ave., Beşiktaş district İhlamurdere Ave., Şişli district Halaskargazi Ave., Şişli district Abdi İpekçi Ave.	Girne Ave., Karşıyaka District
<b>Usage</b>	Temporary	Permanent
<b>Type of Parklet</b>	2 Parallel, Transit road, Bike tie-up spot	2 Parallel, Comfortable, Transit road
<b>Property</b>	Public	Public
		
		
<b>Istanbul Example</b>		
		
<b>Izmir Example</b>		

*tus*, *Aganthus 'Navy blue'*, *Vinca major*, *Trachelospermum jaminooides*, and mostly shrubs and ground cover groups (UrbanGreenUP, 2022). (Table 1).

### 3. Research Findings

Regarding parklet planning issues, we observed that while they generally complied with international planning principles, it has been determined that the 5% slope that needs to be on the ground plane was not accounted for with the Istanbul example, the sidewalk and parklet were not at the same level at either parklet, that there was no light-colored or reflective materials for night vision, that the min.

1.27 cm standard between the sidewalk and parklet was not followed, that reflective materials were not used along the border and in the corners of the street, and that there are tree pits along the parklet in the Izmir example.

In examining said parklet design features, a noticeable lack of both wheel stop elements, at least two strike posts (only one was seen in the Izmir example), as well as vertical elements was observed. It was also determined that lighting, trash bin, play and artistic elements were inadequate in the urban furniture layouts of both areas; shaded area wasn't available with the Istanbul example, as well

as no bike tie-up point or proper markings with the Izmir example. While vegetation layouts were sufficient in the Izmir example, vegetation was inadequate with the Istanbul example. It was determined that upkeep of the Istanbul example was sufficient, while that of the Izmir sample was inadequate (Table 2).

#### 4. Discussion

NACTO (2013) has described parklets as places set up where narrow or congested sidewalks prevent the installation of traditional sidewalk cafes, or where local property owners or residents see the need to expand seating capacity and public space on a particular street. In taking examples around the world into consideration, it can be said there are a considerable number of parklets with cafes and restaurants in their immediate vicinities. When choosing a location for parklets, the fact they are along commercially-zoned avenues and in areas with dense housing units will boost their utilization, so they serve as additional urban interior spaces along avenues with narrow, congested sidewalks. From the use of cafes to visitors, the two examples in Turkey in question are viewed as 'pocket' parks. In addition to picking the right location in its planning, the safety of the parklet itself is important due to its users being right next to vehicle roads. When considered as property, public ownership supports the use of the area throughout the day (Gould, 2021), whereas the examples of those found in Izmir and Istanbul are beneficial in terms of encouraging public use.

It's important to consider permanent sitting, vegetation and particularly bike tie-up points for these parklets. It is worth noting that with the original design of the Izmir parklet example, there was a module planned for a bike tie-up point, as such, it wasn't implemented in the final product. Also, the working platform floor with slip-resistant material for one such parklet produced by the City of Francisco (2013) emphasizes the necessity of having sufficient maneuvering space for the physically handicapped. When we notice the working areas in question, it's seen that wood has been used as flooring in both areas and there are sufficient areas for the physically handicapped to approach. It's crucial that the street side of the parklets is cordoned off from the traffic by vegetation or barriers. While this condition was met with the Izmir example, it was deter-

mined that the barrier deemed inadequate with the Istanbul example. Although wheel stops were drawn up in the plans of both parklets, the fact that neither set of stoppers were applied posed a hazard, whereas it was also noted the wheel holder (preferably two pieces) reflective tapes were excluded as well. The presence of such (preferably yellow) reflective bands on parklets will undoubtedly increase their visibility at night (NACTO, 2013).

As a result of a similar study he conducted in San Francisco, Littke (2016) also mentions the importance of providing permanent seating in many parklets since most of them do not feature such seating. In particular, the fact that the Izmir parklet had a fixed seating arrangement boosts its usage time and comfort. It was also determined that lighting, trash bin, play and artistic elements were inadequate in both of the urban furniture layouts, there was no shade offered in the Istanbul example, and that there was no bike tie-up point or marking with the Izmir example. With the Istanbul example, a shadow element with a minimum height of 2.13m could have been added. Although there no trash bins were made available in neither case, such bins at 9.14m distances are clearly specified in the standards. As Loukaitou-Sideris, Brozen and Callahan stated in their 2012 study, positioning a clearly visible parklet near street illumination will increase its safety. In other words, self-contained, low-voltage lighting is recommended for both areas. Transforming parking lots and green areas in urban environments into parklets will also be beneficial in terms of sustainability and ecological aspects of the city (Bain, Gray, Rodgers, 2012; Bertulis, 2013; Islam, Das, Baschar, 2020). While the vegetation design of the Izmir example was found to be sufficient, it was ascertained that the maintenance of the Istanbul example was adequate, while the Izmir example was inadequate.

**Table 2.** Analysis of Istanbul and Izmir Parklet examples (City of Melford, 2022; NACTO, 2013; Shelby, Turner, Kerber, 2021; The Planning Division - Community & Economic Development Department Of Salt Lake City, 2013)



	Istanbul Parklet Example		Izmir Parklet Example	
	Suitable	Unsuitable	Suitable	Unsuitable
<b>PARKLET PLANNING</b>				
Speed Limit (<40kmh)	√		√	
Away from Intersection or Street Corner	√		√	
In Front of Driveway	√		√	
<5% Street Slope		X	√	
No longer than three parking spaces	√		√	
min. 1.82m wide	√		√	
Alignment of parklet and parking space		X		X
min. 1.27cm between parklet and parking space		X		X
At least 1.8m on side of the road facing sidewalk	√		√	
Guardrail positioned 45 cm. from the road lane	√		√	
Night vision light color material	√			X
Use of reflective material on the restraint		X		X
Reflective tape on streetside and ledges		X		X
Access for the disabled	√		√	
Parklets can't block public utilities	√		√	
Minimum 91.44cm accessible entrance	√		√	
Located away from entrance tree pits	√			X
<b>DESIGN ELEMENTS</b>				
Non-slip surface	√		√	
<b>Important Elements</b>				
Wheel Stop		X		X
Minumum 2 items				
Located at a distance of 90 cm				
Height of between 120-180 cm				
<i>Vertical elements (post and bollards)</i>				
Limitation h= min. 91.44cm max. 106.68 cm	√		√	
Minumum 2 items		X		X
6 cm away from wheel stop		X		X
Reflective surface			√	
Cylindrical shape		X		
<b>Recommended Elements</b>				
Open guardrail (railings) h < 91cm	√		√	
The sub-structure	√		√	
<b>Urban Furniture</b>				
Floor Covering	√		√	
Seating	√		√	
Two 'Public Parklet' signs indicating hours of operation	√			X
No advertising, logos	√		√	
At least 1 trash bin		X		X
Bike Tie-up Spot	√			X
Lighting		X		X
Shades (Minumum 2.13 m)		X	√	
Art		X		X
Game apparatus		X		X
<b>Vegetation</b>				
Drought-tolerant plants		X	√	
Non-poisonous, noxious or invasive	√		√	
Edible plants		X		X
<b>MAINTENANCE</b>	√			X

## 5. Conclusion

As studies conducted by Young (2018), Loukaitou-Sideris et al. (2013), etc. attest, parklets spark community interaction amongst folks of different ages, ethnicities, and incomes. Not only do they create spaces for imagination, play, and enjoyment, but parklets also bring more foot traffic to business, as well as improved perceptions of the street in terms of aesthetics, vitality and safety. This particular study shows the necessity of establishing parklet programs in Turkey as a result of examining such programs in various other countries and cities abroad. As a result of the research carried out, it was concluded that the use of reflective surfaces and wheel stoppers, which are especially crucial for safe use, are insufficient in parklet designs; that vertical elements do not meet minimum usage standards; that no lighting elements were incorporated, and that trash bins and art elements were observed in both areas. It was also determined that the shade and vegetation elements of the Istanbul parklet example were inadequate compared to those of the Izmir example.

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