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Sustainability in the modern architecture of Nicosia: A retrospective view

Lefkoşa'nın Modern Mimarisinde Sürdürülebilirlik: Geriye Dönük Bir Bakış

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Abstract

Architectural approaches that developed and progressed in the modern period were founded on the criteria of modern architecture. It is possible to see the distinctive features of the modern period from the 1920s to the 1970s on the island of Cyprus, which has been under the influence of many cultures for many years. This study's main goal is to investigate the architectural criteria for residences constructed throughout the modern period in the Nicosia region in relation to sustainability parameters and modern architectural approaches. The methodology of the study consists of theoretical, analysis/practical approaches and observations. The analysis of a total of 3 houses was evaluated in the context of form, function, construction, and sustainability parameters. The houses examined during the findings phase were evaluated within the framework of sustainability parameters, and modern architectural approaches taking into account modern architectural criteria. In the houses discussed in the study, free plan, ornament-free facade designs, and large window openings on the facades, depending on the Functionalism, Purism, Cubism, and international style approaches, attract attention as architectural criteria. In this regard, it clearly reveals that the ideals, approaches, and principles of the modern period are related to the sustainability parameters that emerged at that time.

Key Words: Architectural Approach, Modern Architecture Criteria, Sustainability, Modern Period, Nicosia.

Özet

Modern dönemde gelişen ve ilerleyen mimari yaklaşımlar, modern mimarinin kriterleri üzerine kurulmuştur. Uzun yıllar pek çok kültürün etkisi altında kalan Kıbrıs adasında 1920'lerden 1970'lere kadar modern dönemin ayırt edici özelliklerini görmek mümkündür. Bu çalışmanın temel amacı Lefkoşa bölgesinde modern dönemde inşa edilen konutların mimari kriterlerini modern mimari yaklaşımlar ve sürdürülebilirlik parametreleri açısından incelemektir. Çalışmanın metodolojisi teorik, analiz/pratik yaklaşımlar ve gözlemlerden oluşmaktadır. Teorik aşamada modern mimari yaklaşımlar, sürdürülebilirlik parametreleri ve modern mimari incelenmektedir. Analiz/pratik yaklaşım aşamasında Lefkoşa bölgesindeki modern dönem konutları seçilerek konutların güncel analizi yapılmıştır. Toplam 3 konutun analizi form, fonksiyon, inşa ve sürdürülebilirlik parametreleri kapsamında değerlendirildi.

Bulgular aşamasında incelenen evler, sürdürülebilirlik parametreleri ve modern mimari kriterleri dikkate alan modern mimari yaklaşımlar çerçevesinde değerlendirildi. Çalışmada ele alınan evlerde İşlevselcilik, Pürizm, Kübizm ve Uluslararası üslup yaklaşımlarına bağlı olarak serbest plan, süslemesiz cephe tasarımları ve cephelerde geniş pencere açıklıkları mimari kriter olarak dikkat çekmektedir. Bu bağlamda modern dönemin ideallerinin, ilkelerinin ve yaklaşımlarının o dönemde ortaya çıkan sürdürülebilirlik parametreleriyle ilişkili olduğunu açıkça ortaya koymaktadır.

Anahtar Kelimeler: Mimari Yaklaşımlar, Modern Mimari Kriterler, Sürdürülebilirlik, Modern Dönem, Lefkoşa.

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Introduction

The 20th century was the period when new concepts and theories emerged in the field of architecture, innovative examples were presented in discourse and practice, and architectural designs began. Modernism is defined as a global movement in the second half of the nineteenth century that influenced twentieth-century art and Western literature, as well as architecture, music, theater, and visual arts (Frisby, 2004). It is known that in the period called the modern period, new ideas and developments emerged and architectural designs began to become simpler. New approaches have developed under the heading of "modern architecture" in response to these issues. These approaches are often used in numerous applications in the area of architecture in various nations throughout the world. A new perspective was added to the architectural designs of the period with approaches such as Cubism, Functionalism, Bauhaus, Purism, De-Stijl, and International-style. The modern period stands out with designs where functional forms are prioritized, open floor plans, large wall openings, clean, simple lines, and modern and traditional building materials are brought together.

Cyprus was certainly no exception to the global expansion of modern architecture, which did not stop at specific geographical locations (Ali, 2018). This study examines the application of modern architectural criteria in houses in the Nicosia region of Northern Cyprus in the modern period.

Sustainability first emerged in the years when the spread of the modern age increased and modernism replaced it in the context of cultural, social, environmental, economic, technological, and urban growth. This review attempts to contextualize the sustainability criteria of modern architecture within the framework of criteria influenced by modern architectural approaches.

The houses built during the modern architecture period in North Nicosia on the island of Cyprus between 1963 and 1974 were built taking into account social and environmental issues as well as the lives of the users. These houses, which have a plan type that bears the characteristics of the modern period, were built using the two-storey reinforced concrete construction technique. The organization of the floor plans of the houses is created by combining basic geometric shapes. It is evident that the analyzed houses' facade and plan designs used modern

period approaches including functionalism, De-stijl and Cubism.

In this context, the houses constructed in Nicosia during the modern period were assessed in light of architectural approaches, modern architectural criteria, and parameters of sustainability.

Research Questions/ Hypothesis

Within the objectives and goals of the study, the aim of the study is to determine the identity, architectural approaches, and sustainability situation of the modern period buildings in North Nicosia through observation and to offer suggestions. Keeping the identity of the modern period, modern architectural criteria and approaches alone are insufficient. It is suggested to implement architectural designs that adhere to cultural, social, environmental, and economic sustainability parameters for this reason. The following fundamental queries were addressed within the purview of this study:

1. What is the relationship between modern architectural criteria and approaches and sustainability parameters in Houses in North Nicosia?
2. How is the relationship between sustainability parameters and modern architectural approaches and criteria defined?
3. Which of the modern architectural criteria and approaches do Houses have?
4. How do Houses relate to the cultural, social, environmental, and economic parameters of sustainability?

Limitations of the Study

The identity of the modern period in Cyprus is seen in the residential buildings designed by important architects such as Abdullah Onar, Ahmed Vural Behaeddin, and Ayer Kaşif between the 1960s and 1970s. The main reason for conducting this study is to reveal the identities of modern period residences and keep them alive. By examining modern architectural criteria and approaches and sustainability relations, it is seen that the general parameters of sustainability have modern period criteria. When the three modern period residences examined in the context of the study were considered with the parameters of sustainability, it was determined that their social, cultural, economic, and environmental relations overlapped with the architectural criteria of the modern period. In

light of these findings, it is important not to ignore the identity of the modern period in today's sustainable understanding.

Literature Review

Modern Architecture

The term "modern architecture" refers to the buildings constructed in the late 19th and early 20th centuries that exhibit some common attitudes and forms as well as an intellectual background that gave rise to the various acts, movements, and orientations that are used to categorize them (Tanyeli, 1997), (Özyalvaç, 2013). Modern architecture can be described as an approach that developed in opposition to an eclectic style after the Industrial Revolution; it affected other forms of art as well as architecture and addressed the same fundamental concept despite the differences in their forms.

The use of steel and concrete together in structures at the end of the nineteenth century, in the words of art and architectural historian Pevsner, provided Modern Architecture with a new dimension. These materials allowed human beings the opportunity to cross unused openings, build very tall structures, and provide flexibility to the blueprints. By demonstrating qualities like the use of glass, open spaces, as well as utility, modern architecture which emerged as a reaction to nineteenth-century architecture has given architecture many distinct interpretations (Pevsner, 1977).

The search for technologically based forms in the late 19th century ushered certain new movements that would alter the agenda in the disciplines of art and architecture, based on the socio-economic developments. A mindset that sought to purge art and architecture of the classical style was developed as a result of the Arts and Crafts and Art Nouveau approaches that evolved during this time (Birol, 2006).

The philosophy and methods of the day were challenged by Sullivan's Modern Architecture, which asserted the requirement of creating structures in a quick, profitable, modern, and affordable manner. "Form follows function" is one of the key aspects of Sullivan's Modern Architecture. While taking into account the technical, economic, and political circumstances of the time, it was also suggested that the form should achieve a simplicity that would fit the demands of the day. In this trend, steel, a novel material, was employed in the construction of buildings. This architectural approach set the

groundwork for modern architecture understanding from the rationalist perspective (Budak, 1985, Dostoğlu, 1995, Tanyeli, 1997), (Benian, 2010).

Architectural Approaches

In the 19th century, the show of building and facade designs was replaced by a simpler and simpler design. With the branches of philosophy, science, and art that started to develop towards the end of the 19th century, the movements that emerged in the early 20th century as a reaction to the design philosophies of the architects of this period are encountered. It is possible to say that it is the beginning of a new era with these currents.

- **Functionalism**

Function is the relationship between form and the purpose of the building (Z'ychowska, 2019). The dimensions, shape, and proportions of a design alone cannot be considered its aesthetic (beauty); rather, it also involves the practical importance of the purpose that the element or just component of the structure in question serves (Arenibafo, 2017; Winter, 2007). Functionalism's predominance in architecture had a big impact on modernism's development. On how function and form are related, there are many different perspectives. The adage "the form follows the function" by L. Sullivan, had a unique resonance with functionalism ideas in the early Modern period (Schumacher, 2002). Le Corbusier, a famous architect, claimed that the form of architecture is caused by the mind and reflects the best aspects of art, mathematical principles, and a proportionately balanced representation of the total (Behne, 1996). Therefore Form, Corbusier's concept of form, is more important than function (Trisno, 2019).

- **De Stijl**

De Stijl, a significant modernist movement that emerged at the beginning of the 20th century, distinguished itself from prior movements since it only lasted fourteen years, had a complete organizational framework, and lacked distinct patterns of organization (Qin, 2015). De Stijl opposed all decoration and favored a more logical, persuasive application of modern technology and materials (Doorman, 2003). The De Stijl method is a design technique that produces dynamic, unique, and complete abstraction. The new architecture offered examples of monumental, asymmetrical, cost-

effective, and stylistically unbound architectural forms. These suggestions influenced the general forms of modern architecture (Nia, & Rahbarianyazd, 2020; Birol, 2006). Mies van der Rohe was one of the movement's most significant proponents and De Stijl continued to have a important impact on architecture after 1931 (White, 2003).

- ***Bauhaus***

German architect Walter Gropius (1883-1969) established the Bauhaus in the city of Weimar in 1919. Its main goal was to reinvent the tangible world in order to express the unification of all the arts, which was a novel concept (Griffith Winton., 2000). The Bauhaus Art Movement is more than just an educational movement or a design; it is the design of modernity, and it refers to the cultural, economic, and social modernization project that has been ongoing in Europe since 1850. It is well known for championing functionality. This principle placed a strong emphasis on the building's integrity, substance, and structure over ornamentation (Tietz, 2000), (Karaca, 2021). The Bauhaus movement, which promoted a simple, plain, rational architecture, based its principles on fundamental shapes (Benian, 2010). Starting in the 1920s, architects like Le Corbusier, Richard Neutra, Mies van der Rohe, and Walter Gropius developed the fundamentals of Modern Architecture, which gained traction as a result of the influence of Bauhaus on architecture (Dostoğlu, 1984), (Benian, 2010).

- ***Cubism***

The most innovative and influential art approach of the 20th century is acknowledged as being cubism. (Besgen, 1998). Cubism represents the most significant fundamental shift in visual language since Giotto discovered linear perspective in the early fourteenth century (Haftmann, 1960), (Falcetta, 2007). The cubists were highly influenced by Einstein's theory of relativity and emphasized timelessness, that is, the relative and constant change of space, by drawing the appearances of the same object at different times on top of each other (Birol, 2006). Le Corbusier stated that modern architecture may utilize geometry to solve problems. Le Corbusier also followed the artistic tenets of cubist painter Cezanne by asserting that cubes, cones, cylinders, plus pyramids are sharp shapes created visible by light (Gardiner, 1985).

- ***Purism***

Amédée Ozenfant and Le Corbusier, the movement's founders set up the Purism movement in painting, which incorporated machine aesthetics, clean and simple geometric shapes, and the spirit of old classicism (Simic, 2006). Since purism is a philosophy that supports clear, logical forms with laws, it has become more and more popular worldwide and given rise to the International Architecture approach. Architecture has reached an extreme degree with this purifying and understanding strategy, according to purism, which seeks to use ever-simpler forms (Kortan, 1986). Le Corbusier with Mies van der Rohe are two prominent supporters of purism (Birol, 2006).

- ***International Style***

Johnson Philip Cortelyou, an American architect, created the international style, commonly referred to as International Modern or American Rationalist European Architecture. Style International C.F.A. It developed from the experimental work of architects like Vossey, Sullivan, with Adolf Loos, who sought to resolve the stylistic disarray of the 19th century (Hasol, 2014). The style was founded on Le Corbusier's ideals, which can be summed up as pilotis, roof gardens, open planning, horizontal windows, with sunshades (Benian, 2010). Volume rather than mass, clarity with the use of order rather than symmetry, readability, and rejection of gratuitous adornment is among the three categories Hitchcock used to categorize the original qualities of the style (Hitchcock, & Johnson, 1995). Along with these, other distinguishing characteristics of the design include terrace roofs, reinforced concrete skeletons, plain, white facades devoid of ornament, and forms created by the asymmetrical organization of fundamental geometrical elements (Hasol, 2014; Leuthäuser, 2001; Erenler, 1997).

Sustainability

Sustainability is a way of living that maximizes economic, environmental, and social factors while taking indirect and long-term repercussions into consideration (Litman, 2011). The definition and focus of sustainable development up to the second half of the 20th century were environmentalism and the preservation of the natural world. Preventing these injuries caused by people to nature was the major objective of various organizations and societies, which began at the end of the

nineteenth century and continued to be founded from the start of the 20th.

The concept of sustainable development was initially presented in 1987 as part of the publication "Our Common Future" by the Brundtland Commission, formerly known as the (WCED) World Commission on Environment and Development (WCED, 1987; Soini & Birkeland, 2014). The principles of sustainable development, eradicating poverty, equitable resource use and distribution, population management, and the advancement of environmentally friendly technology are all intimately related in our common future report. The study demonstrates how social, economic, and environmental elements are interconnected (Yasemin & Bıçkı, 2006).

Social Sustainability

Social sustainability focuses on the well-being of present and future generations (Chiu, 2003). Social sustainability is often a debated idea and open such as the general concept of sustainable development (Ghahramanpouri & Lamit & Sedaghatnia, 2013). The concept of social sustainability has just recently gained recognition, thus experts are continuously emphasizing the need to define it and are really curious about its precise meaning (Williams, 2014).

Cultural Sustainability

According to cultural sustainability, culture is the most complicated of the two or three difficult terms. Due to the fact that culture has become a key concept in numerous, usually at odds systems of thinking and intellectual disciplines (Soini & Dessein, 2016; Pop et al., 2019). Culture was cited as the fourth component of sustainable development during the Johannesburg Earth Summit in 2002, and this was highlighted at the 2010 World Summit of Local and Regional Leaders. Nevertheless, cultural factors have historically received less attention in sustainable development goals (Appendino, 2017, Morelli, 2011). Cultural sustainability strongly affects conservation goals, which are to use for current needs and to pass on as much importance as possible to future generations (Pereira, 2007).

Environmental Sustainability

A sustainable environment has become one that benefits future generations by leaving the earth in a better or more efficient state. Recycled

materials ought to be completely recyclable or renewable to ensure they have no impact on the environment or increase energy consumption. Likewise, used energy ought to be in the end renewable so that it does not donate to pollution (Boström, 2012). Environmental sustainability has become increasingly popular in popularity (Moldan & Janoušková, & Hák, 2012). For instance, the Environmental Sustainability Programming of the United States National Science Foundation promotes engineering research with the aim of establishing sustainable systems of design that enhance human well-being and that are also correspondingly compatible with maintaining natural systems in 2009 (Moldan & Janoušková, & Hák, 2012).

Economic Sustainability

Economics is the process by which individuals create social and environmental repercussions, and economic sustainability is the process by which economic systems support long-term social and environmental improvements. One of the pillars of sustainability, the economy's sustainability, is crucial for maintaining the social, environmental, and human resources needed for income and living standards (Basiago, 1998). The equilibrium between environmental advantages and economic costs is economic sustainability. This condition of equilibrium includes things like conserving renewable resources, utilizing non-renewables sparingly, and switching to renewable resources while maintaining economic activity (Duran, 2018).

Methodology

In the study, the conceptual framework of the research is presented by mentioning the methods and materials of the research. The data collection method is explained in order to reveal the architectural criteria, approaches, and sustainability context of the modern period. Then, three houses in the context of the modern period Nicosia city of Northern Cyprus were examined, and how they developed was explained. Existing residences were visited and an updated analysis was carried out using the on-site inspection method. Technical drawings of the plans and appearances were made, and photographs of the facade and interior were taken. Theoretical approaches were used in the context of modern architectural approaches and sustainability parameters in the selected houses, and analysis/practical approach evaluation methods and observations were used during the data collection phase. During the current analysis of the collected data, plan typologies of the

houses were created and their current functions were determined. Thus, the data collected emphasizes the necessity of evaluating and applying modern architectural criteria and approaches together with the parameters of sustainability in response to the research questions of the study.

Research Area

Throughout its history, various civilizations have had an impact on Cyprus. Its distinctive architectural design also reflects its extensive cultural history and turbulent past. Architectural styles from many different eras can be found today. Following the establishment of the British government, the Republic of Cyprus was founded in 1960. Bi-regional settlement has been the island's policy since 1974 (Oktay, 2007). See Figure 1.



Figure 1. Cyprus Map with the UN. Buffer Zone
Source: (Burke, 2015).

The capital of Cyprus's island is Nicosia, as it has been for many years. The largest city on the island of Cyprus and the last divided city in Europe, Lefkosia is also known as Nicosia in Turkish and Lefkosia in Greek. See Figure 2. The partition of the medieval Nicosia walls, which enclose the city's historic core, reflects the island's geographic division. It has been the

subject of various research because it is a city that has traces of the histories and cultures of many different civilizations (Bakshi, 2014). In the later years of the British colonial administration (1878–1960), especially after World War II, Nicosia started to grow quickly. Over time, residential settlements were built outside the walled city (Günçe & Mısırlısoy, 2019).



Figure 2. Map of Nicosia
Source: (Mesda, 2011).

Results and Discussion

Modern Architecture in North Nicosia, Cyprus

Although the exact founding date of Nicosia is unknown, it is thought that the city known as Leda formed the basis of the modern city. B.C. Nicosia, a son of Ptolemy I Soter, was this city reconstructed after it was conquered by the Egyptians in 3000 BC, and he gave it his name. The old Nicosia is surrounded by high, strong walls that the Venetians built in 1567 as a line of defense against the Turks. The ancient Nicosia is surrounded by these eleven bastion walls (Akbulut, 1998). In the Venetian era, the settlements outside the walls were completely cleansed and all kinds of structures were destroyed. A deep ditch that is roughly 60 meters wide was then built around the fortress structure. This means that the wall alone served to delineate the urban area (Pasaogullari & Doratlı, 2009; Özdemir, 2018).

Architectural languages differed between the 1920s and the 1970s (Fereos & Phokaides, 2006; Menteş & Donà, 2019). Listable architectural styles include British Colonial, which is primarily a rationalization of regional vernacular architecture. Applying loggias, terraces, verandas, or courtyards to expand the interior space outdoors while using local materials and subtle adornment. After then, a mix of style

emerges that combines aspects of early modernism with British Colonial traits (Menteş & Donà, 2019).

The structures constructed in Cyprus during the 1960s have begun to show signs of modern architecture. It was largely abandoned to build homes the traditional way. They have been replaced by reinforced concrete structures. The majority of houses in rural have been transformed into villas. Most homes and office buildings were constructed in urban areas (Feridun & Feridun, 2013). The majority of homes constructed during 1960 and 1970 had just a few stories. Locally produced materials and conventional construction techniques started to fall out of favor as reinforced concrete's use expanded. Due to the extensive usage of modern building materials like bricks, iron beams, and aluminium, traditional materials were mostly utilized for decorative elements like plating for fireplaces and ceilings and plating for interior or exterior spaces (Cogaloglu & Turkan, 2019).

Modern Architectural Approaches and Sustainability for Suna- Ümit Süleyman House (1960)

A good example of a modern city house is the Suna-Ümit Süleyman House, which was built in the Köşklüçiftlik neighbourhood of North Nicosia. On the main floor, living areas, kitchen, dining area, bathroom, wide terraces, garage,

laundry room, and office are all intended for a family of five. Upstairs, there are three bedrooms, a bathroom, and semi-open terraces looking at the street are located (Uluçay, Uraz, & Pulhan, 2006). See in Figure 3. In the House, where the free plan technique, which is one of the criteria of the modern period, is applied, the

interior spaces are interconnected and flow into each other. Consisting of unadorned, simple geometric forms, the House carries the principles of functionalism, cubism, brutalism, rationalism, and international style from the approaches of the modern period.



Figure 3. Suna-Ümit Süleyman House's ground floor and first floor plans House
Source: (Own authorship, 2023).

The Suna-Ümit Süleyman House's entrance facade's elevation moved up to the street with its tall eaves is another remarkable aspect. Red brick from the area is used to construct the entrance facade, while the remaining wall is constructed

of grey concrete slabs for the majority of its length. Using concrete for the garden walls allowed the design to be integrated (Mesda, 2011). See in Figure 4.



Figure 4. Suna-Ümit Süleyman House's Front Facade Design House
Source: (Own authorship, 2023).

Wide and symmetrical windows have been designed and placed on the facade. The connection between the interior and the exterior is clearly highlighted. Additionally, the facades very skilfully represent the harmony of the pure concrete and white colour. The design of the building took advantage of the reinforced concrete construction method. Without using beams, the floors were applied, and the columns have been carried to the roof. (Mesda, 2011). The house, which is still used as a house today, is one of the most representative examples of the

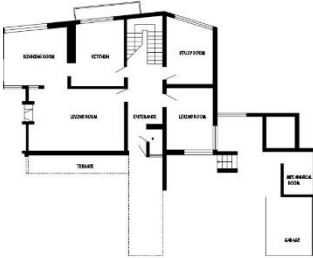



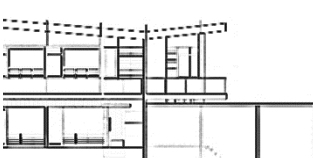
modern period in Northern Cyprus with its material selection, construction technique, and plan setup.

Nicosia Köşklüçiftlik, where the Suna-Ümit Süleyman House is located, is a densely populated area of the city. Access to the house, which is easily accessible, is also very easy on foot or by vehicle. The method of construction of the house not only shapes the architectural identity of the location but also incorporates historical and cultural features. For this reason, it

contributes to cultural sustainability. The relationship of the house with its environment is provided by the large windows and terraces used in its design. It also reflects the architectural criteria and approaches of the period with its modern, local materials and construction

techniques. In this context, it contributes to environmental sustainability by catching harmony with its environment. The house, whose function has not changed, maintains its economic sustainability today as it has social and cultural value. See Table 1.

Table 1.
Modern Architectural Approaches and Sustainability for Suna-Ümit Süleyman House (1960)

Köşklüçiftlik, Nicosia - 1960 - Ahmet Vural Behaeddin House	
 Ground Floor Plan (Own authorship , 2023)	 Entrance Facade (Uluçay & Uraz & Pulhan, 2006)
	 Interior Spaces (Uluçay & Uraz & Pulhan, 2006)
	<ul style="list-style-type: none"> * Free plan technique. * Cube form that is free from ornaments. * The large windows on the facades and the exterior relationship * Functionalism, Purism, Cubism, and International-style approaches
 First Floor Plan (Own authorship , 2023)	<p>Form analysis</p> <p>Function</p> <p>Construction</p> <p>The building, which was designed as a house, still functions as a house today.</p> <ul style="list-style-type: none"> * White and pure facade design * Entrance wall designed with red bricks * Concrete wall design in interior spaces and facade * Reinforced concrete construction technique.
	<p>Sustainability Parameters</p> <ul style="list-style-type: none"> * Accessibility * Walkability, * Transportation
	<p>Social Sustainability</p> <p>Cultural Sustainability</p> <p>Environmental Sustainability</p> <p>Economical Sustainability</p> <ul style="list-style-type: none"> * Architectural style, construction technique and building form, determine elements of the architectural and cultural identity. * A relationship with the indoor and outdoor environment * Durable and environmentally friendly building materials. * Environmentally friendly and harmonious * The house is raising the value of the vicinity business, lands, and residential real estate. In this way, it makes contributes to economic sustainability.
 Front Elevation (Own authorship , 2023)	

Source: (Own authorship, 2023).

Modern Architectural Approaches and Sustainability for Mısırlızade House (1968-72)

Abdullah Onar is one of the pioneers of modern architecture in Cyprus. It is remarkable that he uses plain, simple and pure geometric forms in his designs. All of his projects are highlighted by the use of a universal language and a logical construct.

On the front facade of the house, he created for Osman Nurettin Mısırlızade in Nicosia's Köşklüçüftlik neighbourhood, there is a semi-open area. The two-story house's lower floor holds a garage. With pilots on the ground, the

garage is created underneath the raised space. Even if the welcome area's hall part resembles the sofa in a Turkish home in logic, it initially simply serves as a means of entry to the stairs as well as common rooms. This space, which serves as the hub of the home, offers access to the kitchen, bathroom, and backyard through a unique and condensed corridor plan. While the living space and a separate eating area are usually arranged in a flexible connection, the space for dining is having a direct link with the kitchen. The upper floor is where the bedrooms and baths are located on the upper floor (Yavuz, 2021). See in Figure 5-6.

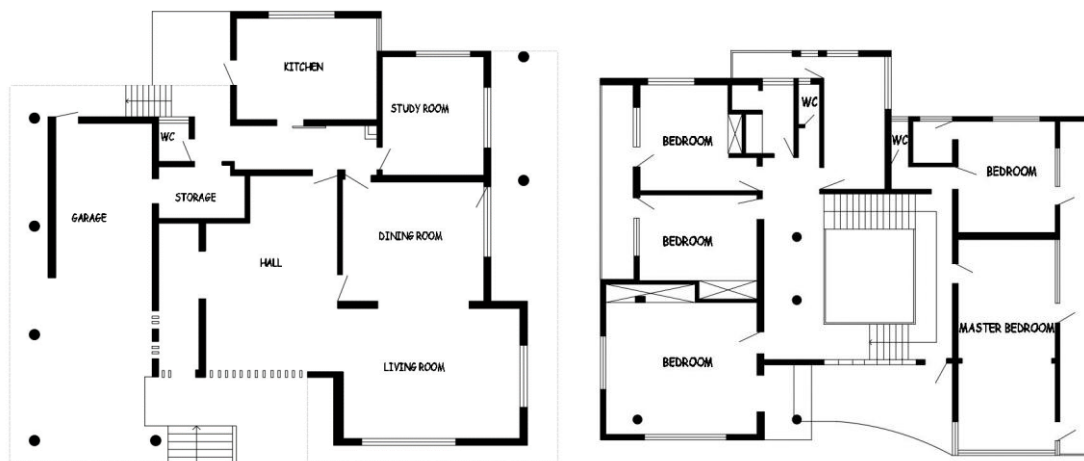


Figure 5. Mısırlızade House's ground floor and first floor plans House
Source: (Own authorship, 2023).

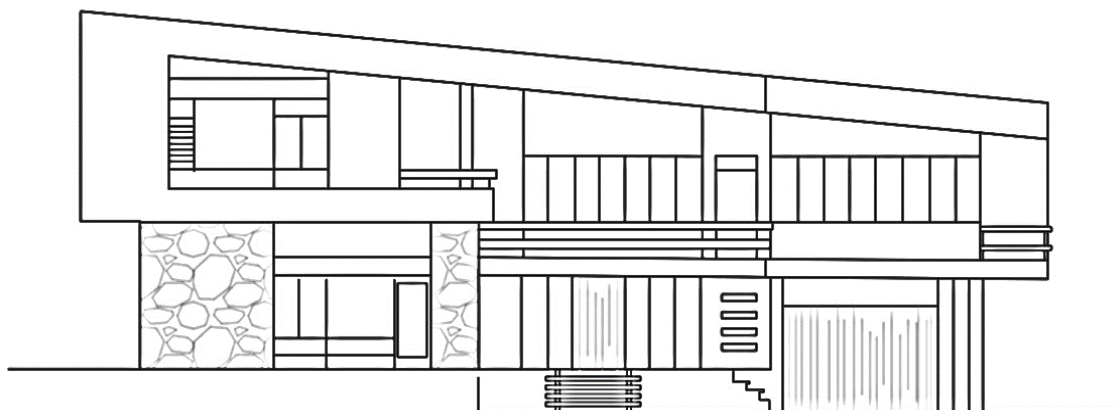


Figure 6. Mısırlızade House's Front Facade Design House
Source: (Own authorship, 2023).

The Mısırlızade House, which was designed as a house between 1968-72, still functions as a house today. The house was built using the reinforced concrete construction technique and was painted white. There are large windows on the facades. The house, which was designed as a terrace roof, was built within the framework of modern period materials and techniques. In addition, the

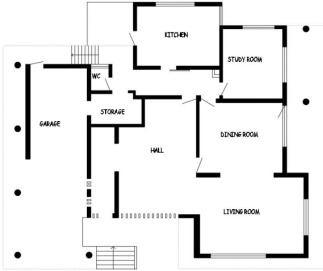

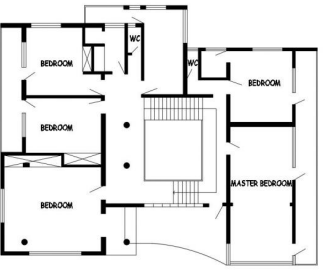
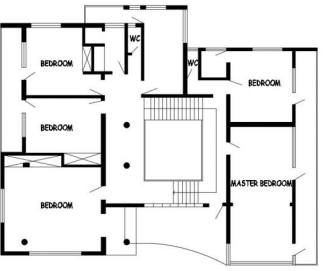
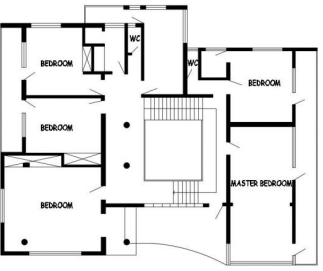
principles of rationalism, functionalism, purism, cubism, Bauhaus, and international style, which are among the approaches of modern architecture, draw attention in the building.

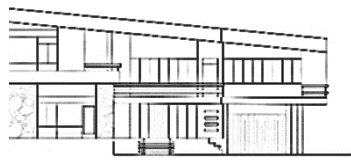
Due to its location, Mısırlızade House carries the sustainability criteria such as transportation by car, walkability, and public transportation. In

terms of its social sustainability, it is located at a point that can be easily accessed either by car or on foot. Because of these features, it carries the social sustainability parameters. With its construction style and technique, Mısırlızade House shapes the architectural identity of the Köşklüçiftlik region. Considering its historical process, it has historical and cultural characteristics. In this context, it carries the parameters of cultural sustainability. Living spaces are associated with its surroundings, as there are large windows on the facades of the

building. Thus, it is in contact with the natural environment. In the house where the interior-exterior relationship setup was designed, modern architectural materials and traditional materials were blended. In this context, the house maintains its environmental sustainability. Mısırlızade House increases the commercial, residential and land real estate values of the region where it is located. In this context, it contributes to economic sustainability. See Table 2.

Table 2.
Modern Architectural Approaches and Sustainability for Mısırlızade House (1968-72)

Köşklüçiftlik, Nicosia - 1968-72 - Abdullah Onar House	
 <p>Ground Floor Plan (Own authorship , 2023)</p>	 <p>Entrance Facade</p>
 <p>Form analysis</p>	<ul style="list-style-type: none"> * The form of a mass, with a simple and free plan technique, in a symmetrical * The form of a plain white cube away from decorations
 <p>Function</p>	<ul style="list-style-type: none"> intertwine interiors * Wide band windows on the facades * Functionalism, Purism, Cubism, and <p>The building, which was designed as a house, still functions as a house today.</p>
 <p>First Floor Plan (Own authorship , 2023)</p>	<p>Construction</p> <ul style="list-style-type: none"> * Reinforced concrete construction technique * Design on the pilots * Large window openings on the facade design
<p>Social Sustainability</p>	<p>Sustainability Parameters</p> <ul style="list-style-type: none"> * Walkability * Transportation * Accessibility
<p>Cultural Sustainability</p>	<ul style="list-style-type: none"> * Building form, construction technique and architectural style, and determine elements of the architectural and cultural identity.



Front Elevation
(Own authorship , 2023)

Environmental
Sustainability

Economical
Sustainability

- * Durable and environmentally friendly building materials.
- * A relationship with the indoor and outdoor environment
- * Environmentally friendly and harmonious

* The house increases the value of commercial, land, and residential real estate in its vicinity. Thus, it contributes to economic sustainability.

Source: (Own authorship, 2023).

Modern Architectural Approaches and Sustainability for Efruz House (1968-72)

The Efruz House are two-story structure with a combination of basic and square forms that lack ornamentation. The living space, dining area, kitchen, guest bathroom, study space, and terrace spaces are all located on the ground floor. The Efruz House (Müdüroğlu House) has an open

floor plan with connecting living and eating areas. To the left side of the entrance door on the main floor, there is a garage as well. The rooms on the main floor vary in size, and the layout is separated into distinct functional areas. There are three bedrooms, a bathroom, and a little balcony on the first level. See Figure 7. Attention is drawn to the direct connection as well as spatial flow between all spaces.



Figure 7. The original ground and first floor plan drawing of Efruz House
Source: (Beyaz & Erçin, 2023).

Structure plans make explicit reference to the modern architectural approach that has been investigated, the dynamic between full and empty spaces a Cubist principle, and basic geometric shapes. Additionally, similar to De Stijl, there are straight lines, simple forms of geometry split into parts, an absence of concentricity, and a clearly organized plan. These structures are characterized by their straightforward, ornately free rectangular, triangular, and square forms. This is a hallmark of Bauhaus architecture.

Efruz house (Müdüroğlu House) was built in the modern period utilizing a combination of traditional and modern materials. The typical natural stone was used for both the outside and interior of these structures, which were constructed using a reinforced concrete construction method. This design emphasized both the characteristics of the modern period and the local materials. The ornament-free facade designs are painted white. Large rectangular window apertures on the facade allowed daylight to flow into the inner spaces and establish a connection between the row houses' interior and outdoor environments. Large window apertures

made in the design of the facade have been found to be in keeping with the facade surface, feature modern period approaches, and foster an indoor-

outdoor link in context with sustainability. See Figure 8.



Figure 8. The original facade drawing of Efruz House
Source: (Beyaz & Erçin, 2023).

The focus area is situated within the densely populated North Nicosia region, characterized by a high population density and heavy traffic volume. This area ranks among the most popular districts in Nicosia owing to its proximity to social, economic, and public amenities. Furthermore, it is readily accessible both by car and on foot, and it excels in terms of neighborhood relations, social contributions to its surroundings due to its strategic location, and functionality. Consequently, the Kumsal region has evolved over time, increasing its significance within the context of sustainability as a result of these distinctive attributes.

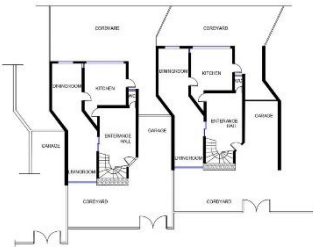


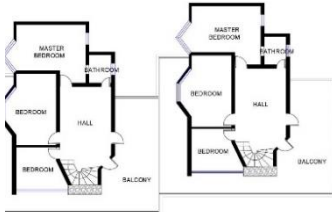

The Efruz House (Müdüroğlu House), which was designed in Northern Nicosia, Cyprus, during the modern period and adhered to its architectural design criteria, was constructed using both modern period materials and local materials. Efruz House is building that most accurately reflect the architectural character and cultural identity of the modern period in terms of architectural approach, construction style, and

architectural criteria when considered in the context of cultural sustainability.

Designed in the Modern period Efruz House (Müdüroğlu House) was constructed in keeping with their environment. Its construction utilized modern and historical elements, which are strong and environmentally friendly, making them still relevant in terms of environmental sustainability in the present. The relationship between interior and exterior was not ignored in the design of that building.

Efruz House (Müdüroğlu House), which was constructed during the modern period, carries cultural value and kept its original function, continuing to be economically viable due to its social and cultural significance. Current, modern materials were used in the construction of the house. Due to their position, the house is situated on the line of a tourist center having high land and property values. Because of this, it continues economically sustainable as well as environmentally sustainable. See Table 3.

Table 3.
Modern Architectural Approaches and Sustainability for Efruz House (1963-74)

Kumsal, Nicosia - 1963-74 - Ahmed Vural Behaeddin House		
 Ground Floor Plan (Own authorship , 2023)	 Entrance Facade (Own authorship , 2023)	 Interior Spaces (Own authorship , 2023)
 First Floor Plan (Own authorship , 2023)	<p>Form analysis</p> <ul style="list-style-type: none"> * Straight, simple, and sharp lines. * Symmetrical plans and geometric forms * Cubism, Bauhaus, De-Stijl, and Functionalism approaches. * Open-plan design concept. * Internal-external relationship <p>Function</p> <ul style="list-style-type: none"> * The building, which was designed as a house, still functions as a house today. * Traditional natural stone material on facade design <p>Construction</p> <ul style="list-style-type: none"> * No ornamentation on the facade design * Rectangular, large window openings on the facade design <p>Sustainability Parameters</p> <ul style="list-style-type: none"> * Density, * Functionality, * Walkability, * Neighborhood relationships, * Social benefits, * Accessibility by vehicle transportation * Construction technique, architectural style and building form determine elements of the architectural and cultural identity. * Environmentally friendly and harmonious * A relationship with the indoor and outdoor environment * Durable and environmentally friendly building materials. * It maintains its economic sustainability due to the use of building materials with cultural value. * It increases land value and residential property values. 	
 Front Elevation (Own authorship , 2023)	<p>Social Sustainability</p> <p>Cultural Sustainability</p> <p>Environmental Sustainability</p> <p>Economical Sustainability</p>	

Source: (Own authorship, 2023).

Discussion

The study aims to analyse the current situation of the modern period in Northern Nicosia. In this direction, the relationship between the criteria of modern architecture the approaches of the modern period, and the parameters of sustainability was determined. In order to reveal this relationship, the findings of the research are

discussed in terms of criteria and style in the context of modern architecture, and the classification of social, cultural, environmental, and economic values in the context of sustainability.

Accordingly, the buildings built in the modern period in Northern Cyprus should be considered as an integral part of the cultural and historical

heritage and much more work should be done to protect them. Thus, it has emerged that the modern period identity will be preserved and kept alive when the modern period buildings are measured in terms of their sustainability social aspect, cultural value, economic situation, and their relationship with the environment without ignoring the architectural criteria and approaches. The houses selected in the study are considered in this context, it is clearly seen that they carried the criteria and approaches of modern architecture as well as the criteria of sustainability.

It was observed that the examined houses had the architectural criteria of the modern period: simplicity, open plan, sharp lines, and geometric forms. It has been made very evident that they also incorporate modern approaches like Cubism, Bauhaus, De-Stijl, and Functionalism.

In this context, it is supported by the findings of the study that the houses analyzed within the scope of the study have preserved their identity with a sustainable approach until today, without losing the architectural approaches and criteria of the modern period.

Conclusion

In many nations around the world today, in the century we now live in, the social, cultural, and environmental repercussions of architectural approaches and architectural criteria that originated with the modern period are still evident. Cyprus, an island that has been influenced by numerous civilizations, features many different kinds of construction styles. This study investigates the link between the impacts of altering living conditions such as swift urbanization, and socioeconomic dynamics in the modern period, and knowledge of sustainable design. All around the island of Cyprus, examples of structures that have been designed with the form-function relationships that are the modern period's defining characteristics and the architectural approaches that arose along with the modern period have existed. In spite of unfavorable circumstances like war, migration, and economy, between the two populations on the island in 1960 and 1974, architectural structures depicting the traces of the modern period were designed in the 1960s and 1970s.

According to the results obtained as a result of the findings, all the houses designed and built in the modern period should be protected. While modern period buildings are changing their function or being renovated, the interventions

made to these structures cause the buildings to lose their original identities. In modern-period buildings, it has been determined that if the modern-period criteria and approaches can be preserved, the building will be sustainable. Houses with cultural value should be taken under protection so that their architectural criteria and approaches are not lost. The social, economic, cultural, and environmental values of the regions where these houses are designed can survive as long as the building identity of that region is preserved. In short, the architectural criteria and approaches of the modern period should not be ignored, along with the parameters of sustainability and sustainability. It is very important to preserve the function of the structure. If the building is going to change its function, its architectural identity should not be damaged so that it can preserve the criteria and style of the period.

As a result, in the current century, socio-cultural, economic, and architectural built environments are created using the concept of sustainability instead of modernism. In this sense, it is possible to say that the ideas, concepts, and approaches of the modern period form the basis of sustainable designs. The significance of modern criteria and approaches has therefore been displayed in this study. It is expected that the sustainability context of the current period architectural criteria and approaches of the study area will add to the scientific literature as a consequence of both literature and analysis evaluations.

Recommendations

According to the results of this study, it is an inevitable conclusion that the houses built in the modern architectural period should be protected. State intervention is required to preserve and maintain the architectural criteria and approaches of modern period residences.

In addition to modern architectural criteria and approaches, it must be addressed together with sustainability parameters in order to preserve the identity of the modern period.

As a result, the recommendations of this study are listed below:

- It is recommended that the criteria and architectural approaches of modern architectural period residences be considered together with sustainability parameters.
- It is strongly recommended that relevant stakeholders work together to ensure that the

identity of the modern period buildings examined in this study is not lost and preserved.

- It is recommended that more data and document-based studies be conducted on modern architects and buildings in Northern Cyprus.
- According to the analysis results of the modern period residences with historical and cultural value examined in North Nicosia, it is recommended to identify all residences/structures built throughout the island in the modern period in order to preserve their identity.

Bibliographic references

- Akbulut, İ. (1998). *History of Northern Cyprus and Historical Monuments*. Cyrene.
- Ali, F.A. (2018). The influence of Le Corbusier on the emergence of the aesthetic values in the modern architecture of Cyprus. *J. Contemp. Urban Aff.*, 2, 1-12.
- Appendino, F. (2017). Balancing Heritage Conservation and Sustainable Development—The Case of Bordeaux. In *IOP Conference Series: Materials Science and Engineering* (Vol. 245, No. 6, p. 062002). IOP Publishing.
- Arenibafo, F.E. (2017). The Transformation of Aesthetics in Architecture from Traditional to Modern Architecture: A case study of the Yoruba (southwestern) region of Nigeria. *J. Contemp. Urban Aff.*, 1, 35-44.
- Bakshi, A. (2014). Urban form and memory discourses: Spatial practices in contested cities. *J. Urban Des*, 19, 189-210.
- Basiago, A.D. (1998). Economic, social, and environmental sustainability in development theory and urban planning practice. *Environmentalist*, 19, 145-161.
- Behne, A. (1996). *The Modern Functional Building*. VA, USA: Getty Research Center for the History of Art and the Humanities.
- Benian, E. (2010). *An evaluation of Interior-Exterior Relationship in Modern Architecture*. (Doctoral Thesis), Trakya University, Institute of Natural Sciences, Edirne, Turkey.
- Besgen, A. (1998). The Effects of Cubist Design Theory on Modernism and Post Modernism. In *Proceedings of the 4th International Conference on Design and Decision Support Systems in Architecture and Urban Planning*, Eindhoven University of Technology, Maastricht, The Netherlands.
- Bayaz, Ç., & Erçin, Ç. (2023). Evaluation of Modern Architecture Criteria in the Context of Sustainability and Architectural Approach; Modern Period in North Nicosia. *Sustainability*, 15, 10005. <https://doi.org/10.3390/su151310005>
- Birol, G. (2006). “Emergence and development of modern architecture”. *Megaron-Journal of Balikesir Branch of Chamber of Architects of Turkey*, pp. 3-6.
- Boström, M. (2012). A missing pillar? Challenges in theorizing and practicing social sustainability: Introduction to the special issue. *Sustain. Sci. Pract. Policy*, 8, 3-14.
- Budak, C. (1985). Presentation: On the concepts of Modern architecture. *Journal of Architecture*, 23, pp. 17-23.
- Burke, J. E. (2015). *a Britain and the Cyprus crisis of 1974: conflict, colonialism and the politics of remembrance* (Doctoral dissertation), Newcastle University, England.
- Chiu, R. L. (2003). *12 Social sustainability, sustainable development and housing development*. In *Housing and social change: East-west perspectives* (Vol. 221). New York, NY, USA: Routledge.
- Cogaloglu, M., & Turkan, Z. (2019). Plan organization in XX. Century housing architecture in North Cyprus. *Amazonia Investiga*, 8(22), 381-388. <https://amazoniainvestiga.info/index.php/amazonia/article/view/738>
- Doorman, M. (2003). *5. Innovation in Painting And Architecture: De Stijl*. In *Art in Progress*; Amsterdam University Press: Amsterdam, The Netherlands, pp. 81–114.
- Dostoğlu, N. (1995). Conceptions of architecture after the Modern. *Mimarlık Journal*, 263, 46-50. <http://dergi.mo.org.tr/dergiler/4/443/6432.pdf>
- Dostoğlu, S. (1984). Beyond Modern Architecture. *Mimarlık Journal*, 22, pp. 17-21. Accessed on 21 June 2023. <http://dergi.mo.org.tr/dergiler/4/507/9343.pdf>
- Duran, B. (2018). *The importance of the concept of sustainability, the problems encountered, and the examination of sustainability reports of companies* (Master's thesis), Başkent University Institute of Social Sciences, Turkey.
- Erenler, E. (1997). Purism. *Eczacıbaşı Art Encyclopedia*, 3. <https://disk.yandex.com.tr/i/JD27yCIeZ3AJeA>
- Falcetta, J.R. (2007). Geometries of Space and Time: The Cubist London of” Mrs. Dalloway”. *Woolf Stud. Annu*, 13, 111–136.
- Fereos, S., & Phokaides, P. (2006). Architecture in Cyprus between the 1930s and 1970s. *Docomomo*, 35, 15-19.



- Feridun, S., & Feridun, A. (2013). *A Tale of Two Architects, from the 1960s to the Present*. Işık Bookstore: Nicosia, Cyprus.
- Frisby, D. (2004). *Analyzing modernity*. In *Tracing Modernity Manifestations of the Modern in Architecture and the City*. Hvattum, M., Hermansen, C., Eds.. London, UK: Psychology Press, pp. 3–22.
- Gardiner, S. (1985). *Le Corbusier*. Istanbul, Turkey: AFA Publications. <https://vdoc.pub/download/le-corbusier-7q3fpponknd0>
- Ghahramanpouri, A., Lamit, H., & Sedaghatnia, S. (2013). Urban social sustainability trends in research literature. *Asian Soc. Sci.*, 9, 185.
- Griffith Winton, A. (2000). *The Bauhaus, 1919–1933. Heibrunn Timeline of Art History*. New York: The Metropolitan Museum of Art.
- Günçe, K., & Mısırlısoy, D. (2019). Assessment of adaptive reuse practices through user experiences: Traditional houses in the walled city of Nicosia. *Sustainability*, 11, 540.
- Haftmann, W. (1960). *Painting in the Twentieth Century*. London, UK: Lund Humphries, Vol. 1. <https://acortar.link/xRPVzi>
- Hasol, D. (2014). *Encyclopedic Dictionary of Architecture* (13th Edition). Istanbul: Yem Publishing.
- Hitchcock, H. R., & Johnson, P. (1995). *The international style*. WW Norton & Company.
- Karaca, A. (2021). A review of architectural periods and comparing with today's architecture. *International Journal of Development Research*, 11(01), 43835-43838.
- Kortan, E. (1986). Aesthetic perspective on 20th-century architecture. *Yaprak Publishing House*.
- Leuthäuser, G. (2001). *Architecture in the Twentieth Century*. Taschen: Cologne, Germany, Volume 1.
- Litman, T. (2011). Sustainability and Livability: Summary of Definitions, Goals, Objectives and Performance Indicators. *Victoria Transport Policy Institute*. https://www.vtpi.org/sus_liv.pdf
- Menteş, A., & Donà, V. (2019). Transformation of Cinema Buildings and Spaces in Nicosia: Early-Mid 20 th Century Heritage. *ATINER's 11th Annual International Conference on Architecture July*.
- Mesda, Y. (2011). An analytical approach to the house design in the walled city of Nicosia in Cyprus. *Des. Princ. Pract. Int. J.*, 5, 389-430.
- Moldan, B., Janoušková, S., & Hák, T. (2012). How to understand and measure environmental sustainability: Indicators and targets. *Ecological indicators*, 17, 4-13.
- Morelli, J. (2011). Environmental sustainability: A definition for environmental professionals. *J. Environ. Sustain.*, 1, 2.
- Nia, H. A., & Rahbarianyazd, R. (2020). Aesthetics of modern architecture: A semiological survey on the aesthetic contribution of modern architecture. *Civil Engineering and Architecture*, 8(2), 66-76.
- Oktay, D. (2007). An analysis and review of the divided city of Nicosia, Cyprus, and new perspectives. *Geography*, 92, 231–247.
- Özdemir, S. (2018). Two Walls of Lefkoşa: The Validity of Division. *İdealkent*, 9(23), 30-57.
- Özyalvaç, A. N. (2013). The concept of modernity in architecture and Turkey. *FSM Scholarly Studies Journal of Humanities and Social Sciences*, (1), 294-306.
- Pasaogullari, N., & Doratlı, N. (2009). *Design principles of public open spaces in the walled cities: A Study in the Walled City of Nicosia, Cyprus*. Nicosia: Near East University Press.
- Pereira, H. N. (2007). Contemporary trends in conservation: culturalization, significance and sustainability. *City & Time*, 3(2), 15-25.
- Pevsner, N. (1977). *European architecture in its main lines*. Istanbul: Cem Publishing House.
- Pop, I. L., Borza, A., Buiga, A., Ighian, D., & Toader, R. (2019). Achieving cultural sustainability in museums: A step toward sustainable development. *Sustainability*, 11(4), 970.
- Qin, S. (2015). On De Stijl and Architectural Design. In *Proceedings of the 2015 2nd International Conference on Education, Language, Language, Art and Intercultural Communication (ICELAIC-15)*. Henan, China, 7-8 November. Atlantis Press: Amsterdam, The Netherlands, 2015, pp. 567-568.
- Schumacher, T. L. (2002). "The Outside is the Result of an Inside": Some Sources of One of Modernism's Most Persistent Doctrines. *Journal of Architectural Education*, 56(1), 23-33.
- Simic, A. (2006). *Le Corbusier's Purist Period and the Concept of Truth in Architecture* (Doctoral Dissertation), University of Cincinnati, Ohio.
- Soini, K., & Birkeland, I. (2014). Exploring the scientific discourse on cultural sustainability. *Geoforum*, 51, 213–223.
- Soini, K., & Dessein, J. (2016). Culture-sustainability relation: Towards a conceptual framework. *Sustainability*, 8, 167.
- Tanyeli, U. (1997). "Modern Architecture", *Eczacıbaşı Art Encyclopedia*, II. Volume. Istanbul: YEM Publication. <https://disk.yandex.com.tr/d/Ik2TuvIy8Ux3IQ>

- Tietz, J. (2000). *The story of architecture of the 20th century*. Konemann.
- Trisno, R., & Lianto, F. (2019). Relationship Between Function-Form in The Expression of Architectural Creation (*File PDF*).
- Uluçay, P., & Uraz, T., & Pulhan, H., (2006). Local Expansions of Modernism. Suna-Ümit Süleyman House-Nicosia, Mimarca 73. *Chamber of Architects Journal*, 17(73).
- White, M. (2003). *De Stijl and Dutch Modernism*. Manchester, UK: Manchester University Press, p. 39.
- Williams, R. A. (2014). *Vocabulary of Culture and Society*. Oxford, UK: Oxford University Press.
- Winter, E. (2007). Aesthetics and Architecture. *Br. J. Aesthet.*, 48, 235.
- Wced, S. W. S. (1987). World commission on environment and development. *Our common future*, 17(1), 1-91. <https://acortar.link/N2lztD>
- Yasemin, K., & Bıçkı, D. (2006). The 'Sustainability' argument and the 'Deep Ecological' objection. *Gazi University Faculty of Economics and Administrative Sciences Journal*, 8(3), 231-249.
- Yavuz, E. (2021). A Modern in Cyprus: Abdullah Onar, Housing and the Design of a Modern Life. *METU Journal of the Faculty of Architecture*, 38(2).
- Z'ychowska, M.J. (2019). Bauhaus—Didactic Experiments and Their Legacy. *Glob. J. Eng. Educ.*, 21, 134-138.