ÇAĞLA BEYAZ

ARCHITECTURAL APPROACHES AND SUSTAINABILITY IN THE MODERN PERIOD: A STUDY OF EFRUZ HOUSES

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Ph.D. THESIS

Çağla BEYAZ

Supervisor
Assist. Prof. Dr. Çilen ERÇİN

Nicosia
September, 2023

Approval

We certify that we have read the thesis submitted by Çağla Beyaz titled **"Architectural Approaches and Sustainability in the Modern Period: A Study of Efruz Houses"** and that in our combined opinion it is fully adequate, in scope and in quality, as a thesis for the degree Doctor of Philosophy in Interior Architecture.

Examining Committee	Name-Surname	Signature
Head of the Committee:	Prof. Dr. Zeynep Onur	.....
Committee Member:	Assist. Prof. Dr. Cemaliye Sunalp Gürçınar	.....
Committee Member:	Assoc. Prof. Dr. Buket Asilsoy	.....
Committee Member:	Assist. Prof. Dr. Simge Bardak Denerel	.....
Supervisor:	Assist. Prof. Dr. Çilen Erçin	.....

Approved by the Head of the Department

05/10/2023

Prof. Dr. Zihni Türkan
Head of Department

Approved by the Institute of Graduate Studies

...../...../2023

Prof. Dr. Kemal Hüsnü Can Başer
Head of the Institute

Declaration

I hereby declare that all information, documents, analysis, and results in this thesis have been collected and presented according to the academic rules and ethical guidelines of the Institute of Graduate Studies, Near East University. I also declare that as required by these rules and conduct, I have fully cited and referenced information and data that are not original to this study.

Çağla Beyaz

30/08/2023

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Çağla Beyaz

Abstract

Architectural Approaches and Sustainability in the Modern Period: A Study of Efruz Houses

Beyaz, Çağla

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Cyprus influenced by numerous civilizations over the years. Following the war in 1974, both regions of the island were affected by social, cultural, economic, environmental, and political issues. Despite the architectural approaches that came up with the modern period have different tendencies, the foundation of all of them depends on the criteria of modern architecture. This thesis' major objective is to examine the architectural criteria for Efruz Houses (Müdüroğlu Houses) constructed during the modern period located in the Nicosia Kumsal region in circumstances of sustainability parameters and modern architectural approaches. Theoretical, analysis/practical approaches and observations are involved in the methodology. Discussions of modern architecture, modern architectural approaches, and sustainability parameters are argued in the theoretical approach stage. The modern period dwellings in the Kumsal/Nicosia region were chosen as the thesis's subject, and a current analysis of those houses was done during the analysis/practical approach stage. The modern period houses that change function or do not change function are assessed in the findings portion of the thesis in the framework of modern architectural approaches and sustainability parameters, taking into account modern architectural criteria. In the cultural context, architectural-cultural identity, and architectural-cultural historical value were evaluated. In the social context, functionality, density, accessibility, neighborhood relationships, and social benefits were observed. In the environmental context, functional and constructional relationships with the environment, indoor-outdoor environmental quality, and environmental benefits were observed. In the economic context, the durability, and availability of construction resources were evaluated by observation. The studies and findings clearly demonstrated that the ideals, principles, and approaches of the modern period are related to the sustainability parameters that appeared during that period. The study makes the necessity of implementing modern period approaches in sustainable designs come out.

According to this, modern architectural criteria must be incorporated into and put into applied to today's sustainable designs. It aims to add to the body of literature by existing the worth and significance of houses, sustainability parameters, of modern period criteria and approaches.

Key Words: modern period, architectural approach, sustainability, modern architecture criteria, Efruz Houses (Müdüroğlu Houses)

Özet

Modern Dönemde Mimari Yaklaşımlar ve Sürdürülebilirlik: Efruz Evleri Üzerinden Bir İnceleme

Beyaz, Çağla

Doktora, İç Mimarlık Anabilim Dalı

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Kıbrıs yıllar boyunca pek çok uygarlığın etkisinde kalmıştır. 1974'teki savaşın ardından adanın her iki bölgesi de sosyal, kültürel, ekonomik, çevresel ve politik sorunlardan etkilendi. Modern dönemle birlikte ortaya çıkan mimari yaklaşımlar farklı eğilimlere sahip olsa da hepsinin temeli modern mimarlığın kriterlerine dayanmaktadır. Bu tezin temel amacı Lefkoşa Kumsal bölgesinde modern dönemde inşa edilen Efruz Evleri'nin (Müdüroğlu Evleri) mimari kriterlerinin sürdürülebilirlik parametreleri ve modern mimari yaklaşımlar çerçevesinde incelenmesidir. Metodolojide teorik, uygulamalı/pratik yaklaşımlar ve gözlemler yer almaktadır. Teorik yaklaşım aşamasında modern mimari, modern mimari yaklaşımlar ve sürdürülebilirlik parametreleri tartışılmaktadır. Tez konusu olarak Kumsal/Lefkoşa bölgesindeki modern dönem konutları seçilmiş ve uygulamalı/pratik yaklaşım aşamasında bu konutların güncel analizi yapılmıştır. Tezin bulgular bölümünde işlev değiştiren veya değiştirmeyen modern dönem konutları, modern mimari kriterleri dikkate alınarak modern mimari yaklaşımlar ve sürdürülebilirlik parametreleri çerçevesinde değerlendirilmiştir. Kültürel bağlamda mimari-kültürel kimlik ve mimari-kültürel tarihi değer değerlendirildi. Sosyal bağlamda işlevsellik, yoğunluk, erişilebilirlik, komşuluk ilişkileri ve sosyal faydalar gözlendi. Çevresel bağlamda çevre ile fonksiyonel ve yapısal ilişkiler, iç-dış çevre kalitesi ve çevresel faydalar gözlemlenmiştir. Ekonomik bağlamda inşaat kaynaklarının dayanıklılığı ve kullanılabilirliği gözlem yoluyla değerlendirildi. Çalışmalar ve bulgular, modern dönemin ideallerinin, ilkelerinin ve yaklaşımlarının o dönemde ortaya çıkan sürdürülebilirlik parametreleriyle ilişkili olduğunu açıkça ortaya koydu. Çalışma, sürdürülebilir tasarımlarda modern dönem yaklaşımlarının uygulanması gerekliliğini ortaya çıkarmaktadır. Buna göre günümüzün sürdürülebilir tasarımlarına modern mimari kriterlerin dahil edilmesi ve uygulanması gerekmektedir. Konutun değerini ve

önemini, sürdürülebilirlik parametrelerini, modern dönem kriter ve yaklaşımlarını ortaya koyarak literatüre katkı sağlamayı amaçlamaktadır.

Anahtar Kelimeler: modern dönem, mimari yaklaşım, sürdürülebilirlik, modern mimari kriterleri, Efruz Evleri (Müdüroğlu Evleri)

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List of Abbreviations

UNESCO:	The United Nations Educational, Scientific and Cultural Organization
DOCOMOMO:	Documentation and Conservation of Buildings, Sites and Neighbourhoods of the Modern Movement
USA:	United States of America
ICOMOS:	International Council on Monuments and Sites

CHAPTER I

Introduction

The 20th century was the period of new concepts and theories in the area of architecture, the presentation of innovative examples in discourse and practice, and the beginning of the architectural designs. It is clearly seen that there were significant breakthroughs, from the breaking of an atom to Einstein's Theory of Relativity in the twentieth century, while the art of painting, which is closely related to architecture, started to take a basic and abstract approach. Due to societal events, a profound change was observed during this time, and everything previously understood about how the human mind perceives reality was completely upside down.

Modernism was defined as a global movement that influenced twentieth-century art and Western literature as well as architecture, music, theatre, and visual arts in the latter half of the nineteenth century (Frisby, 2004). Radical changes in the economic, social, architectural, and artistic spheres marked the 20th century. It is known that throughout the period, known as the modern period, new ideas and advancements were made, and architectural designs started to become more straightforward. In an effort to find solutions to the new issues resulting from the Industrial Revolution, that radically changed how humanity viewed the world, modern architecture was created more than a century ago (Amen, 2017).

New approaches that went under the name of "modern architecture" have arisen depending on these issues. These approaches have been met often in the area of architecture in several applications in different countries around the globe. A new viewpoint was added to the period's architectural designs by approaches like Functionalism, Futurism, Expressionism, De-Stijl, Bauhaus, Cubism, Purism, Constructivism, International Style, Organic Architecture, and Brutalism. Modern architecture encompasses a variety of approaches as well as includes several criteria. The modern period has come to the fore through designs prioritizing functional forms, open floor plans, wide wall openings, clean, straightforward lines, and combining modern and traditional building materials. At the same time,

Le Corbusier's five principles for determining modern architecture are included in these criteria.

Cyprus was most definitely not an exception to the global expansion of modern architecture, which did not stop at particular geographic locations (Ali, 2018). This thesis examines the application of contemporary architectural standards in the construction of row houses in the Kumsal region of Northern Cyprus, particularly in Efruz, during the modern period. It also investigates the impact of modern architectural approaches. Through Efruz houses constructed in Nicosia, was examined how the forerunner Cypriot architects of the time reflected new architectural criteria into the island architectural approach in keeping with their own education. This review attempts to contextualize the sustainability criteria of modern architecture within the framework of criteria influenced by modern architectural approaches. Sustainability first emerged throughout the years that the modern period spread and gained ground and, within the context of social, economic, cultural, environmental, technological, and urban growth, has superseded modernism. Sustainability, which has been closely related to architecture, adopts environmentally friendly design strategies, preserves an existing structure approach while permitting long-term use of the newly constructed building, and adopts and incorporates all of this explicitly into the design. Thus, designs that are accepted and put into practice the parameters of sustainability have been used for a very long time in terms of economic, social, cultural, and environmental aspects.

This review attempts to contextualize the sustainability criteria of modern architecture within the framework of criteria influenced by modern architectural approaches

The Efruz row houses, which were constructed in Northern Nicosia on the island of Cyprus between 1963 and 1974 during the modern architectural period, were built with consideration for the users' lives as well as social and environmental issues. These rowhouses have five various plan types and are constructed using two-story reinforced concrete building techniques. The organization of the house’s floor plans is created by combining straightforward geometric shapes. It can be noticed that the investigated Efruz Houses (Müdüroğlu Houses) have adopted modern period approaches of cubism, functionalism, and de-stijl into their facade and plan designs. In context with this, the modern architectural criteria of Efruz row houses

constructed in Nicosia's Kumsal region during the modern era have been looked at and assessed from the perspective of sustainability parameters and architectural approaches.

Statement of the Problem

In the city of Nicosia, buildings with high historical and cultural value remain neglected and change their function without being faithful to the original, not protecting their original function, and not carrying out revitalization and improvement works, negatively affecting life in social, environmental, cultural, and economic aspects.

Since the city needs buildings that reflect its culture, it is also very important to preserve the sustainability of the areas where these buildings are frequent and to feel the spirit of the period in which they were built when they came across these buildings. Buildings that have lost their identity in the modern period lose their value, are exposed to many different functions, and lose their historical identity and cultural heritage.

The main problem that emerged as a result of the research and observations made is the possibility of losing the cultural values and sustainability of the buildings that have the characteristics of the modern period and their surroundings by being exposed to neglect for a long time.

Purpose of the Study

The main goal of the thesis is to conduct a scientific assessment of the modern period criteria and sustainability parameters in North Nicosia. This thesis aims to examine the current conditions of the selected houses within the scope of the study, in line with the original identities of the modern period, by considering the architectural criteria. Another aim of this thesis is to reveal the social, cultural, environmental, and economic conditions of the houses in the selected region within the framework of sustainability parameters. The thesis makes no attempt to alter how modern architecture or sustainability is currently defined. It emphasizes the relationship between modern architecture criteria and approaches and sustainability. Between modernism and sustainability, there is a lot of shared ground. In this context, it is believed that adopting the modern period approaches and accepting the

continuity between the want to be modern and the idea of sustainability will lead to the development of a more comprehensive viewpoint. Because of this, to offer the current analysis of the chosen dwellings, modern period criteria, and sustainability parameters ought to be examined jointly. Along these lines, the goal of this thesis is to detect whether they change the function or not of Efruz row houses that carry modern period criteria and evaluate them with modern period criteria and sustainability parameters.

Research Questions / Hypotheses

In line with its aims and objectives, the aim of the study is to present suggestions for some row houses in North Nicosia, which have changed function in the process, to preserve their modern period identities, to preserve the architectural heritage of the modern period and to function together with sustainability parameters. The preservation of modern architectural criteria and approaches alone is not enough to keep the identity of the modern period alive. Therefore, it is recommended to apply building designs that overlap with social, cultural, environmental, and economic sustainability parameters. In this context, when modern architectural criteria are integrated into present-day sustainable designs and applied in practice, they have a significant impact on both environmental quality and social, cultural, and economic, sustainability. Within the scope of this thesis, the following main questions were asked:

- The relationship between the architectural criteria and approaches of the modern period and the sustainability parameters in Efruz Houses (Müdüroğlu Houses) located in the North Nicosia Kumsal region?

In addition to the basic question of the thesis, it is aimed to find answers to the following questions:

- The relationship between modern architecture and the concept of sustainability?
- How is the relationship between modern architectural criteria and approaches and sustainability parameters defined?
- Which of the modern architectural criteria and approaches do Efruz Houses have?
- How does Efruz Houses relate to the social, cultural, environmental, and economic parameters of sustainability?

Significance of the Study

The research provides a theoretical explanation of the modern period and the context of sustainability. At the same time, it documents in detail the criteria and approaches that emerged in the modern period, the parameters of sustainability, and the relationship between sustainability and architecture. In this context, there is a need to handle the modern period buildings designed in the city of Northern Nicosia with the concept of sustainability, and the study in this direction presents this important part of the need. The row houses selected in the Kumsal area of Nicosia and designed in the modern period not only help the region to develop and gain value but also create a great working space advantage as it is one of the regions with the modern period houses in the city. In addition, the region is an important area in determining social, cultural, environmental, and economic factors due to its location. The study conducts the relationships between the criteria and approaches of modern architecture and sustainability and sustainability parameters in the region. The study will be a ready proposal to preserve the sustainability of the modern period houses in the city, and will be a usable data for the modern period field studies to be made in the future. As another option, the research inspires new fields of study in future research.

Limitation of the Study

The study was carried out in three streets (Meriç Sokak, Tuna Sokak, Tuncer Hasan Sokak) in the Kumsal district of North Nicosia. The study aimed to make a theoretical, analysis/practical approaches and observations evaluation and comprehensive analysis of Efruz row houses on the streets in the selected region in the context of modern architectural criteria. As a research limitation, the area and number of modern houses that can be evaluated can be expanded. In addition, modern architectural criteria and the evaluation of the modern period in terms of social, cultural, environmental, and economic aspects, which are among the parameters of sustainability, are also important parts of the study. Evaluations were made by visiting the row houses in the selected region and examining them. Scientific studies can also be carried out in houses designed in the modern period in various streets of Nicosia in order to more accurately evaluate the criteria of modern architecture and sustainability parameters (social, cultural, environmental, economic) in North Nicosia.

Scope of the Research

In the first part of the study, a general introduction is made and the problem, the purpose of the study, research questions, limitations, and the scope of the research are explained.

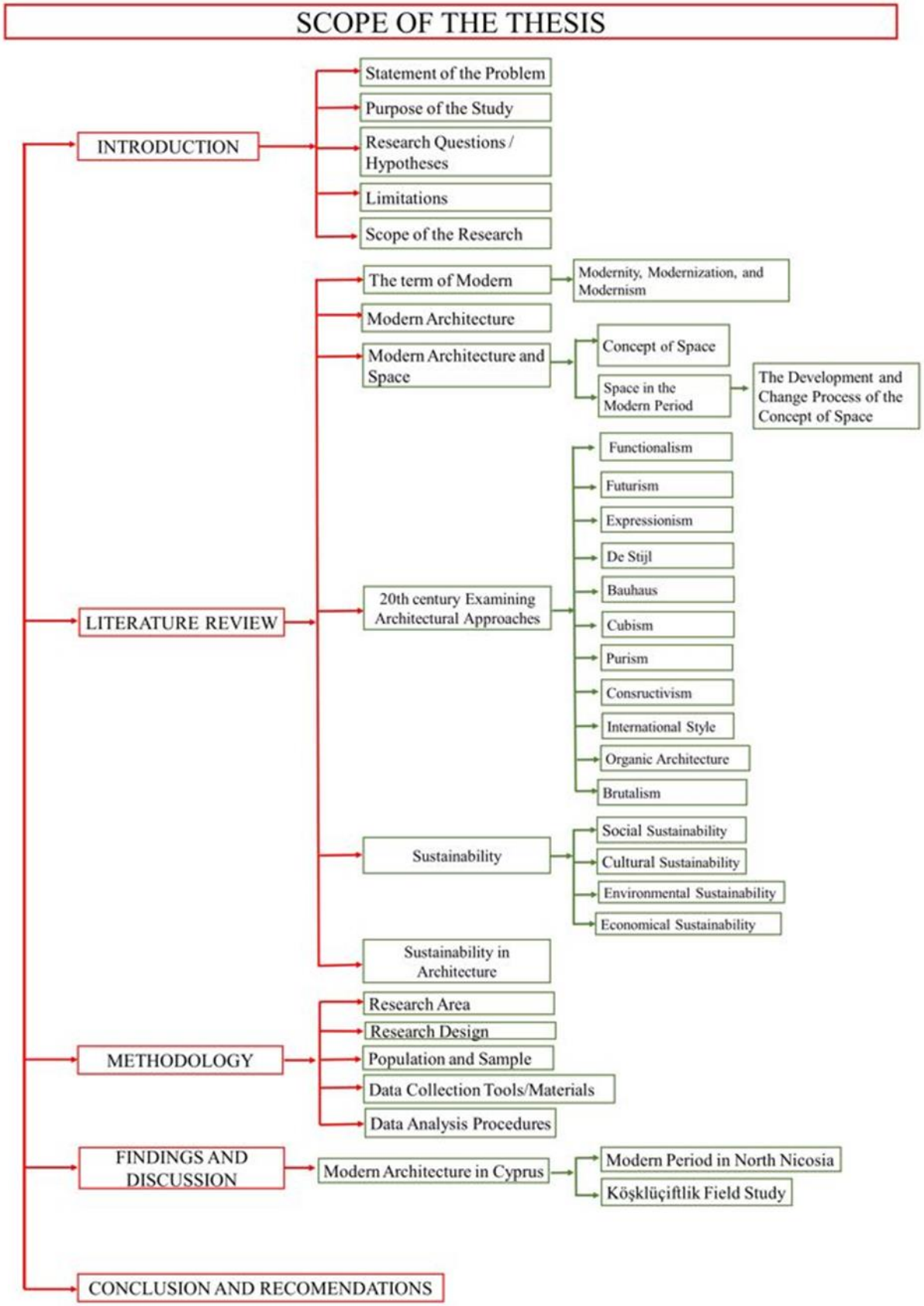
The second part of the study is the literature design. Expansions of the words modern, modernity, modernity and modernism are examined. Accordingly, the concept of space, which developed in the period of modern architecture and modern architecture, was examined in detail together with the styles that emerged in this period. In addition, the emergence of the concept of sustainability and its parameters are explained in detail. The concept of sustainability, which is the subject of many disciplines, is also discussed in the discipline of modern architecture. In the last part of the literature review, a conceptual framework is created and explained.

In the methodology part, which is the third part of the study, the city of Nicosia in Northern Cyprus has been evaluated. The methodology is then explained in detail under the headings of Research Design, Population and Sampling, Data Collection Tools/Materials, Data Analysis Procedures, and Study Plan.

The fourth part of the study includes the findings of the research. Discussions are made in line with the findings. In the last section, there are conclusions and recommendations regarding the whole study. See Figure 1.

Figure 1

Scope of the Thesis (Author, 2022).



CHAPTER II

Literature Review

In this section, important theoretical issues related to the subject of the study are discussed. The modern period, which is one of the important periods of the architectural discipline, and the concept of sustainability, which has been on the agenda in recent years, is explained. It continues by explaining the modern architectural approaches that emerged and developed with the modern period and the parameters of sustainability. In addition, the analysis and evaluation of nine similar samples selected from different countries are also included in the section.

The term Modern

The term "modern" is distinct from prior ages and comes from the Latin word "Modo," which means "Today." The term "modern" has been used in many contexts to distinguish between modern and traditional ways, and it is quite useful in all aspects of daily life (Azizi & Eshaq Z. 2022).

The Latin terms modo and hodie, which indicate "today," "recent times," or "fashion" as it is used today, are where the word "modern" comes from. The phrase was initially used to separate the Christian era away from the Roman & pagan past in the fifth century in Latin as "modernus." (Cevizci, 2002 Transportation Bağce, 2021). The current sense of the word "modern" today and the meaning it had in its original usage, however, are quite different. In both, the term "modern" denotes the passage from the "old" to the "new" or the "new one," but when it was originally used, the old was meant to as a dark and idolatrous place and the new was the world that was ruled by Christianity. The term modern as we know it now is based on the rejection of the first modern; in other words, what was new in the prior modern, Middle Ages, has turned into the old world of the so-called "new" modern. The term "modernitas," which was used to denigrate the "new but unconventional" in the Middle Ages, can be argued to have served as the beginning of the term "modern" in this regard (Bağce, 2021).

According to the definition of the term of "modern" is used to define the time period from the medieval period and subsequent periods, the social transformation that persisted after the start of the Renaissance and reform movements. However, these times are now defined as classical or nostalgic. Due to this circumstance, the definition of the modern notion now calls for a standard that takes into account the way of life of modern, developed societies. In this context, the term modern, which is utilized to define the transition between "old" and "new," has been attempted to be equal to today's usage by dividing the domains of culture, science, and art (Benian, 2010).

Modernity, Modernization, and Modernism

When modernism is the topic, words like modernity and modernization are frequently used interchangeably. These ideas aren't the same or synonymous, despite the fact that they are intimately related to one another (Şahin, 2013).

Their intellectual, social, and cultural status that helps to restore the distinctiveness from Western culture is referred to as "modernity" in this context. The idea of modernity is frequently used to apply to define the current state of the globe in contrast to prior epochs or more rudimentary existent civilizations. It frequently takes the place of ideas like industrialization, capitalism, reason, secularism, media, and communication society, as well as other organizational or ideological qualities (Madsen, 2014).

On the other hand, modernization describes the extensive change process that has occurred in the economic, social, cultural, and political spheres and has been centered in Western Europe since the end of the medieval period. Social scientists as well as historians are the main users of this notion. Modernization denotes a multifaceted development process by expressing a substantial departure from the conventional. Modernization in this context refers to changes in positivism, nationalism, capitalism, industry, secularism, bureaucracy, specialization, and urbanization-related processes (Küçükalp, 2010).

Modernism is a new point of view, a development in culture, and a new way of living. Modernism is a response to Middle Ages thought and behaviour.

Modernism is a movement of thought that adheres to the positivist, rationalist, human autonomy, and universalism of knowledge tenets. Because critical thinking is so closely related to modernism, its roots can be found in ancient philosophy. Modernism has a logical, forward-thinking, and positivist viewpoint; in this way, it is similar to Enlightenment philosophy. (Yıldırım, 2009). Modernism has been described in a variety of ways; for instance, Faulkner Peter defined it as all the different styles of art that developed in the twentieth century (Barzinji, M., 2013).

Modernism, which is commonly used as a synonym for both modern architecture with functionalism, is basically an architectural style that favours the use of the plain form over adornment in structures. In response to changing needs and a rapidly growing population, simple constructions resulted (Menga, 2022).

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, Transportation Özyalvaç, 2013). Modern architecture can be described as an approach that developed in opposition to an eclecticist 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. Regarding the development of modern architecture, various perspectives have been provided. While some historians state that it occurred at the beginning of the 20th century, others claim that it occurred in London in the 1850s (Özyalvaç, 2013).

Modern architecture was thought to have its beginnings in the 19th century in the industrial revolution with the subsequent introduction of mass production, which sparked a widespread dislike of historicism, fascination with functionalist planning, and utilization of modern building materials and cutting-edge technologies (Ali, F., 2018, Emmanuel, A., 2017 Transportation Ahmad N., 2006).

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).

While the world's scientific and technological advancements have led to certain breakthroughs, political disputes, wars, and regime-related changes have also resulted in economic downturns, migration, and demographic shifts. In this process, architecture intensified structural and intellectual efforts when the conditions were favourable; when the circumstances weren't favourable, he has been looking for ways to grow and produce new works. In the 20th century, novel and distinctive theories, inventions, and works of art were created in the fields of science, philosophy, architecture, and art. Especially towards the start of the twentieth century, it can be observed that art, science, and also architecture evolved collaboratively by influencing one another. It has a close relation to social, political, economic, aesthetic, and technological aspects as well as factors of ideology and science (Benian, 2010).

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. The two revolutions created a fascinating period of transition during the 19th and 20th centuries (Birol, 1996).

The modern movement starts when sculptors and painters start to gravitate more and more toward industrial design. The modern trend first emerged in England and evolved into fashion with the designers' ideas. After England, it started to develop widely in Germany and the United States. Due to the congruent efforts of the modern movement's founders, this movement has evolved into a universal

movement. As a worldwide architectural approach, it has also gained widespread (Biçer, 2006).

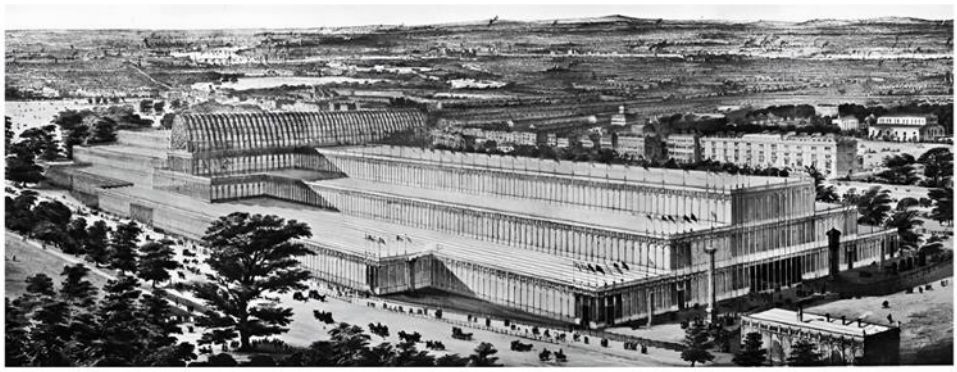
The end-of-the-year developments, the new materials produced by the industrial revolution, and the new construction techniques all altered the appearance of architecture in the 19th century. Three basic approaches were first used by the new architecture technology. The first method is merely altering the material by severing it from all major forms; the second entails modifying the previous forms by utilizing the durability of the new materials; and the third is creating new structural forms (Kırcı, 2013).

Modern architecture, which emerged as a response to the style of the 19th century, has given many distinct meanings to the built environment by showcasing elements such as glass surfaces, open layouts, and functionality. The shift in architectural thought out of historicism and toward transparency set the stage for the emergence of modern architecture. Pioneers of early modernism included Mies van der Rohe, Le Corbusier, Peter Behrens, Walter Gropius, Adolf Loos, Auguste Perret, and Frank Lloyd Wright (Moffett, Fazio, Wodehouse, 2003).

The initial generation of modernists made contributions to the development of a theoretical framework for their philosophy in order to advance knowledge of architecture and inspire upcoming designers to follow the avant-garde movement. They portrayed the characteristics and elements of modern architecture in their work. A shared notion of the function of modern architecture was created by the functions of Luis Sullivan (form follows function), simplicity and economy by Ludwig Mies van der Roch (less is more), and the transparency, formality, and abstractions of Le Corbusier (Ali, F., 2018). Frank Lloyd Wright and Adolf Loos' nature and rationality served as the foundation for modern architecture, which evolved into the distinguished designs of other notable architects like Gropius, Mies van der Rohe, Le Corbusier, etc. (Zhao, 2021). A new generation of building construction techniques, conceptions, meanings, and technologies was launched with the construction of The Crystal Palace, which was built in 1851 and is often regarded as the precursor to modern architecture. See in Figure 2 (Ali, F., 2018).

Figure 2

Crystal Palace, 1851 (Schoenefeldt, 2012).



One of the advances made possible by the Industrial Revolution was the turning of iron into steel, which was then produced using industrial techniques and used extensively over time. This innovation had an impact on both industrial and architectural principles and elevated simplicity to the fore. Under the direction of Willam Le Baron Jenney, Daniel Burnham, and Louis Sullivan in the final decade of the 19th century, the Chicago School gained notoriety for its designs that satiated the commercial demands of American urban centers. The philosophy and methods of the day were challenged by Sullivian'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 Sullivian'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; unique foundation systems were created; and, particularly in modern office designs, selective attitudes were avoided by the use of horizontal windows and the beginnings of simple structures. This architectural approach set the groundwork for modern architecture understanding from the rationalist perspective. (Budak, 1985, Dostoğlu, 1995, Tanyeli, 1997 Transportation Benian, 2010).

The modern architect values functionality in design, clarity in plan, and simplicity in form. Modern architectural products are typically devoid of ornamentation and any unnecessary elements (Ali, F., 2018). In his article

“Ornament and Crime” from 1908, Adolf Loos suggested that decoration should be given up in architecture. Loos claims that the decorations on the buildings were designed for selfish and childish entertainment. Loos states that ornamentation no longer fulfils its cultural purpose in some countries as a result of mass production (Nia & Rahbarianyazd, 2020). Instead of any decorations or other features that are unrelated to the general design, the space itself will be the main focus. Additionally, there is a focus on the materials’ honesty; nothing is hidden, and the real qualities of the materials, particularly concrete, are revealed in their forms. Beams and other structures are typically seen by the users, revealing the inside workings of the building. In addition, the architect creates an open plan that is influenced by linear geometry by using linear elements that are rectangular forms and striking horizontal and vertical characteristics, particularly the windows, stairs, rooflines, and different structural elements (Ali, F., 2018).

One of the most important architects of the twentieth century, Adolf Loos, promoted simple, ornament-free architecture and emphasized that architecture should have a functional purpose. Additionally, Loos rejected the symbolic elements of the structures and stated that they should be constructed economically and with societal appeal (Birol, 2006). The "Raumplan" (volumetric plan) notion that Loos introduced revolutionized architecture. Le Corbusier eventually interpreted this as the "Freeplan" (free plan). Purist techniques have also been based on the ornamentation from Loos' designs, employing pure forms of materials, and emphasizing space (Frampton, 2007).

The forerunners of the modern movement constructed a number of iconic new white structures in the 1920s: Mies van der Rohe constructed the German Pavilion in Barcelona, Gropius created the Bauhaus school building, and Alvar Aalto created Gropius' hospital and private home. Nicholas Pevsner, a well-known historian of the modernist movement, likewise admired the cold and impersonal nature of new abstraction (Zhao, 2021).

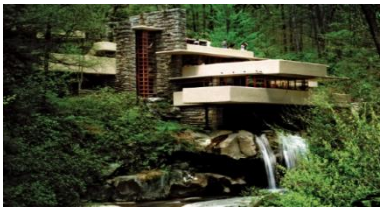
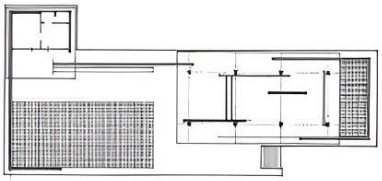
In 1926, Le Corbusier and Pierre Jeanneret outlined five ideas for the modern period of architecture. The first thing is the support, which he refers to as “pilotis”. As a result, the bulk is divided from a floor by columns and the walls stop serving as

bearers. The roof gardens are the second. To preserve the natural surroundings and promote structural harmony, gardens are situated on the flat. The third option is to freely design the floor plan. The absence of carriers in the walls allows for free plan design. The fourth component is the ribbon windows, which are horizontal windows that run horizontally along the exterior walls and let light into the rooms. The free facade's design is the fifth item (Conrads, 1971, Özsavaş Uluçay, 2020).

One of the best examples is the Fallingwater House by Frank Lloyd Wright, the renowned Villa Savoye by Le Corbusier, and the Barcelona Pavilion by Mies van der Rohe. See Table 1. The innovative design makes no allusion to earlier architectural styles; it was a revolutionary step forward by the late 1920s. The wide area surrounding the building and the open-concept interior is conducive to the ideas of communal life and communication. The form clearly reflects the intended purposes of the residential structure and lacks any superfluous ornamentation (Rowe, 2011).

Table 1

The buildings design approach between 1920–1940 according to the free plan (Author, 2023).

The Building Designs in Modern Architecture		
Le Corbusier Villa Savoye 1927	Mies van der Rohe Barcelona Pavilion 1929	Frank Lloyd Wright Fallingwater House 1935-39
 (Gibson, 2016)	 (White, J. 2010)	 (Britannica, 2023)
 Plan (Bianchini, 2023)	 Plan (Manzoni, 2012)	   Plan (ArchDaily, 2010)

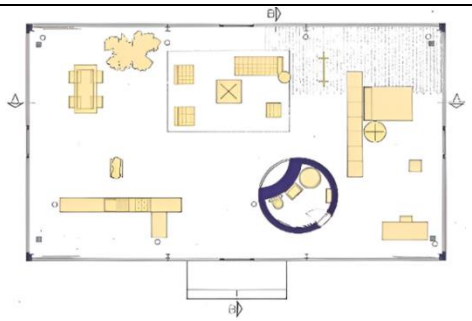
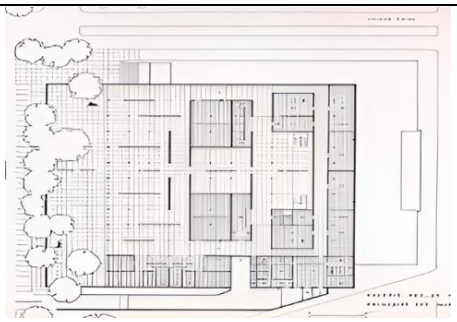
Due to the assistance of multiple art schools, actions, and organizations such as constructivism, De Stijl, Bauhaus, and the CIAM, modern architecture has grown stronger and more widely accepted in the twentieth century. The avant-garde has taken it upon itself to adopt and spread modern architectural ideas and create new architectural visual appeal that glorifies technologies and materials. An amazing example of how a modern product should look is the Bauhaus building in Dessau (Ali, F., 2018, Sadler, 2004). It is usually accurate to say that, “The Modern Movement was formed, aesthetically and pedagogically, whenever the Bauhaus passed to its new structure and syllabus in Dessau in 1926” because the Bauhaus had

a huge impact on the physical structure of the Modern Movement (Amen, 2017, Ballantyne, 2004).

In the following years, the use of steel and glass increased, and the liberation of spaces continued. The Glass House built by Philip Johnson in the state of Connecticut in 1949 and the Berlin National Art Gallery designed by Mies van der Rohe in Berlin in 1965 are designs that show that spaces are liberated with the disappearance of the walls that define the boundaries of the space. See Table 2.

Table 2

Philip Johnson, Glass House; and Mies van der Rohe, Berlin National Art Gallery Design between 1945–1965 (Author, 2023).

Philip Johnson, Glass House; and Mies van der Rohe, Berlin National Art Gallery	
Philip Johnson Glass House, 1949	Mies van der Rohe Berlin National Art Gallery, 1965
	
(Brownell, 2016)	(Wainwright, 2021)
	
Plan (Lablog, 2014)	Plan (Atlas, 2022)

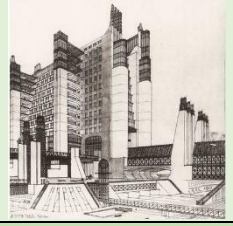
Using technological developments and the increase in material diversity, new construction techniques have shown themselves in buildings. In modern architecture, which is based on functionality, historicism was rejected. The developments experienced after the industrial period were architectural.

The modern period brought, social, cultural, economic, and technological changes, and different discourses emerged. Depending on these discourses, different architectural approaches, which basically advocate the same idea, have started to show themselves.

These approaches were classified as, Early Modernism (1900–1925), Functionalism (1900-Today), Futurism (1910–1925), Expressionism (1910–1925), De Stijl (1910–1925), Bauhaus (1919), Modernism and Art Deco (1911–1940), Cubism (1920–1930), Purism (1920–1930), Constructivism (1920–1930), International Style (1920), Organic Architecture (1920–1935), International Style in America (1931), Brutalism (1952–1975), Late Modernism (1945–1970), (Lawrence, Miller, Smith, Taylor, 2012, Transportation Şahin, 2022). Architectural timelines in the modern period are given in Table 3 in chronological order.

Table 3

Architectural Timeline in Modern Period (Modernity), 1900-1960 (Author, 2023).

1900-1925 **Early Modernism**	**1900-present day** **Functionalism**	**1910-1925** **Futurism**	**1910-1925** **Expressionism**	**1910-1925** **De Stijl**	**1919** **Bauhaus**	**1911-1940** **Art Deco**	**1920-1930** **Cubism**
Peter Behrens AEG Berlin Tirbune Hall	Le Corbusier Louis H. Sullivan Villa La Roche	Antonio Sant'Elia La Città Nuova (The New City)	Antoni Gaudí Casa Batlló	Gerrit Rietveld Schröder House	Walter Gropius Bauhaus	William Van AlenChrysler Building	Villa Kovařovic Josef chochol
							
(Merrill, E., 2016)	(Paris Tourist Office Official Website, 2023).	(Kim, 2005)	(Sveiven, 2023)	(Iconıchouses.org, 2022)	(Żychowska, M., 2019)	(Apmann, B., 2022)	(VitVit, 2018).

	1920-1930 **Purism**	**1920-1930** **Constructivism**	**1920** **International Style**	**1920-1935** **Organic Architecture**	**1931** **International Style in America**	**1952-1975** **Brutalism**	**1945-1970** **Late Modernism**
	Le Corbusier Villa Savoye	Hammer Sickle Architectural Fantasy Iakov Chernikhov	Auguste Perret Villa La Roche	Frank Lloyd Wright Falling Water House	Mies Van Der Rohe Walter Gropius Lake Shore Drive Apartments	Tomás Lugo Marcano, Jesús Sandoval Dietrich Teresa Carreño Cultural Complex Kunckel	Mies Van Der Rohe IBM Plaza
							
	(Simon, 2016)	(Beth, 2011)	(Paris Tourist Office Official Website, 2023)	(Britannica, 2023)	(20 th Century Architcture, 2023)	(Tang, 2015)	(ArchitectureChicago Plus, 2013)

Modern Architecture and Space

Due to its social, cultural, economic, and anthropological characteristics, the idea of space exists within society; it both includes a world of owning and leaves its traces, as well as the need to be in continual touch with all the living areas in neighbourhoods, places, towns, and urban units as well as its environment. Space and time are interconnected ideas, and they don't follow one another in a straight line (Lefebvre, 2007 Transportation Akyildiz, 2020). It is seen that the diversity of design for spaces and, accordingly, the architectural patterns that have developed throughout history, and the demands of society and individuals change over time, necessitating new forms. As a result, rather than being in a straight line or opening directly in front of us, time and space instead exhibit diversity in various directions (Akyildiz, 2020).

Concept of Space

The humanities, the natural sciences, the social science, and philosophy all employ the concept of space, yet they all have very different understandings of it. The reasons for using each discipline's space are distinct from one another. Space was first used in the 1300s. The word "space" is Arabic in origin. Despite having multiple interpretations, the word's conceptual origins are all connected to Ancient Greek philosophy. Space is now understood to include a place, a house, a dorm, and space. It is referred to as the area of space which is constrained by people in architectural defined (Hasol, 2014). While Massey says that, depends on the terms "space" and "spatial" and views these conceptions as unambiguous and incontrovertible (Massey, 2001).

As to the dictionary definition, space is a volume that encompasses everything that is known to exist, has a finite size, is limitless, and has the three dimensions of height, length, and depth. For the first time, Lithuanian mathematician Minowski proposed a unity of structure, time, and space that takes place in three dimensions and time. Later, the theory of Einstein's relativity was integrated with this idea (Cevizci, 1999).

Locke established an empiricist theory of space, contending that our senses of sight and touch are how we perceive space. There is clearly one certainty, according

to Locke's empiricist interpretation of Descartes' "De Omnibus Debutandum," which can be discovered in the discussion of "reality." Descartes claims that mass and space, which are connected to matter filling space, were the same thing. He also defines space as matter (Cevizci, 2005).

In the 1890s, the idea of space first appeared in art; it is connected to the senses, perceptions, and psychology. The three dimensions of space width, height, and depth are thought to be generated by the human body. In addition to the visual and tactile senses, the movements of the body and the eyes also play a role in how space is perceived (van de Ven, 1978 Transportation Erk, G. & Uluoğlu, 2013). By stating how humans frequently treat space, time, place, and movements as phenomena and believe they can be defined by perceptible objects, Newton opened up a fresh vista of space. 'Absolute and relative, authentic and seeming, mathematical and universal' are the three classifications that Newton suggests for these concepts (Young, J. 1984).

According to Leibniz; absolute time that exists in reality, violates the principles of sufficient reason and identity of the indistinguishability. Winterbourne underlined that Leibniz's conception of space did not include any empty space. Leibniz raises a challenge to the notion that there might be any reason for placing boundaries on the substances present in the universe (Winterbourne, 1988).
Space and time, according to Kant, are merely two different kinds of intuition that are not fundamentally linked. Hegel, on one other hand, asserts that time must result from space (Akyildiz, N. 2020).

According to Foucault, in terms of the meaning of the spaces we live in; space is neither a kind of emptiness in which we can place individuals and objects, nor a void that can be coloured with various shades of light (Arenibafo, F., 2017). The space that produces the plane of existence allows us to construct new spaces in that one develops distinct regions that cannot be dominated by another and also aids in our sense of the fact that we cannot be reduced to the sense of another's concept of space (Foucault & Miskowiec, 1986).

Hillier contends that space is never merely the immaterial backdrop to our tangible existence. It is an important part of how cultures and societies are built in

the real world and are built for us as 'objective' realities through this constitution. Space is much more than just a blank canvas for cultural and social forms to be utilized. It is incorporated right into those forms. Human conduct is not limited to physical space. Its own unique spatial forms exist (Hillier, 1996 Transportation Dursun, 2009).

The renowned philosopher Engels, on the other hand, asserts that the space of architecture has changed and that changes in architectural form and expression throughout history reflect in architectural spaces as well. Engels claims that while the architectural space has evolved over time, the forms have changed in tandem with the social, political, and cultural differences that have been experienced. Additionally underlines that the most crucial aspect of architecture that unites many historical eras and the civilizations associated with those eras is space. Also, Engels asserts that the environment, society, and faiths of the time period in which it is located all influence the place (Özorhon, İ. 2002).

Space serves as both the beginning and the conclusion of architecture in Zevi's opinion. Additionally, architectural space is more than just the perimeter's dimensions (height, breadth, and length). These spatial components give us the chance to define space. In fact, he describes the idea of space as a specific area in which these things can be found and moved around in (Zevi, 2015). According to Ching's definition of space, the visual shape, the acoustic and lighting quality, and the features around it transform the living environment into an architectural space (Ching, F., 2023).

The Development and Change Process of the Concept of Space

Mankind has shaped and created the understanding of space by imitating nature in order to preserve its weak anatomical structure. While creating the spaces, humans made use of natural materials such as wood, stone, and mud that they obtained from their surroundings, taking into account the suitability of the geographical conditions of the region where they are located. The first space formations started with human beings who have settled down. With the Industrial Revolution that took place in the following years, the machines that entered human

life brought standardization and the understanding of space gained a new perspective.

In accordance with Giedion's tripartite space comprehension, space is split into three periods: from Egypt to Greek civilization, from Rome to the second half of the 19th century, and the current era. The first fully formed civilizations, Mesopotamia and Egypt, are where the idea of space originally emerged. This idea persisted till the Greek civilization. Greek architecture, on the other hand, allows the construction of a democratic, new European lifestyle focused on the person, whereas it symbolizes the final phase in the first space concept. Rome is where the idea in the second space first appeared, and from there, it spread throughout all of Europe. The Renaissance and Baroque eras saw a rediscovery of the fundamental ideas. Greek and Roman philosophy is in opposition to the Medieval Period, which is founded on a barbaric background. The Romantics were the first to re-discover the Gothic Cathedrals of the period, followed in the second part of the 19th century by engineers and architects. Giedion says that in order to experience the idea of a third space, thought and emotion must be united because they were previously kept apart. (Giedion, 1971). The separation of public and private spaces in society will come as a result of the subsequent step, which is being conscious of the abrupt changes in modern life (Demirkaya, 1999).

The act of making space in Egyptian architecture was influenced by the populace's faith in eternal life. The purpose of this era's architecture is to maintain consistency and order. Space has been mostly created as a result of human resistance to change, corruption, and death. The devotion of the Egyptians to nature is another one of their beliefs. Egyptians constructed their buildings in response to this, drawing inspiration from nature (Roth, L., 2002). Contrary to the Egyptians who were preoccupied with spiritual matters, the Mesopotamian people placed more value on daily living. They constructed palaces and castles that showcased the monarchy's power. They also disclosed the fundamentals of military design. When they constructed their 33 forts, they designed them with effective resistance in mind (Bazin, 1998).

The Greeks of antiquity made sculptures of their gods and adored them. Temples were also required to keep these precious objects, valuables, and animals safe. These temples are closed to the public and only the senior priests in charge are allowed inside. On the main axis of the temples, a sculpture of a god was erected, and people flocked to it to offer adoration. In front of the temple, religious ceremonies were conducted around an altar (Mutlu, 2001). The spaces were typically built around the religious edifice and took shape appropriately. The religious framework of society and spiritual structures have been particularly effective in the design of space. Spaces were shaped according to particular shapes since these forms were known and certain in the past. These shapes included square, rectangular, round, and oval areas. Combinations of specific forms can also create space combinations. Through angled space volumes, each structure, which is arranged on its own axis, merges with the others (Gündoğdu, 2002).

The agora is the most significant monument in a Greek city. Due to the environment, urban living areas were crucial in Greek architecture because people spent most of their time outside. The Agora, the only major building in Greek architecture, was where people met for political purposes, went sightseeing, and did their shopping. Theatres are the most innovative element of Greek architecture. Due to the preponderance of faith in the beginning, the orchestra section, wherein religious events were translated through music, was highly important in these constructions. Actors in this discipline gained prominence as people's propensity for comedy and tragedy in the arts grew over time. The orchestra's significance diminished at the same time. The result was a reconfiguration of the area to accommodate different orientations of individuals (Mutlu, 2001).

According to Heinz Kohler, Roman architecture is a closed internal and outdoor architecture, in contrast to Greek architecture. The Roman architecture features well-organized and readable space routers and determinants (Gür, Ş., 1996). The core of Roman architecture is how the space is shaped in this style. Greek temples and architecture, BC. Roman architecture, which dates back to the 8th century, is recognized for its basic design in theatres, baths, and other buildings. It differs from Greek architecture in that it makes use of novel building kinds and innovative construction methods that enable structural richness (Hasol, 2014).

Roman temples, unlike Greek temples, were located at the end of a strictly defined open space with their axes aligned. The main distinction between Greek and Roman temples is how the sanctuary is oriented around the temple and how the temple is positioned relative to this area. Greek principles and architectural features are present throughout the Roman temple. The building that most accurately exemplifies the Roman architectural style and the powerful influence of this space definition is. It is the Pantheon, which Hadrian constructed between 118 - 128 BC. (Gündoğdu, 2002). The architectural historian Siegfried Giedion stated that the Pantheon best exemplifies the emergence of this visual space conception, whereby *"from then on, all concepts of architectural space would almost invariably be synonymous with the concept of a hollowed-out interior."* (Giedion, 1971). According to Giedion, the Pantheon and the Roman baths are examples of ancient forms that first demonstrate the dichotomy, or rationalization of a homogeneous continuous space, as a distinct inside versus outside space. For instance, the first appearance of wide wall openings or windows in the Roman baths, as opposed to the predominantly courtyard form, or "inner" space, of traditional buildings, functionally defines this dichotomy (Lerner, 2008).

The nature of the space changed during the medieval period, which began with the fall of the Roman state. A new understanding of design emerged due to the power struggles that occurred during this period and the threats from the North and East. This architectural philosophy holds that urban aspects were incorporated into the architecture of places, and trade and feudalism was given prominence (Roth, L., 2002).

After the Middle Ages, in the 15th and 16th centuries, European architecture evolved, drawing inspiration from the classical components of ancient Greek and Roman art. Roman art's forms, volumes, and ornamentation replaced the verticality that characterized medieval structures (Hasol, 1993). Renaissance architecture is dominated by square and circular forms. The window arches utilized on their facades are semicircular and of equal size. From each of these angles, it has been a successful example of Renaissance architecture shaping. Renaissance architects started to sculpt spaces employing modules whose proportions to integers as three-dimensional space became more important (Roth, L., & Akça, 2002).

Compared to the order of prominence architecture, baroque architecture is more complicated. The baroque style of architecture broke the rigidity of the Renaissance setting and replaced its openness with ambiguity. shapes emphasizing flexibility and spatial depth were adopted in place of the flat shapes prevalent in Renaissance architecture. The term "interior" came into use at the same time that the Baroque period produced interior chambers that provide light (Mutlu, 2001).

A socio-cultural life that was built on speed was brought about by the social and economic advances of the Industrial Revolution in 1847. The way that many people see space has changed as a result of this circumstance. Through Einstein's theory of relativity, surrealism, and cubism the absolutist understanding that was prevalent in science and art before that changed (Man, S., 2017).

In the human mind, space, which had been discussed and acknowledged as a fundamental concept in many different fields, takes on numerous meanings and is formed by various perceptions and methods of thinking. The handling of the concept of space has evolved as a result of modernism in the arts. The idea of space never attained such prominence before modernism. If the Latin word "modo," which means daily, is the source of the word "modern," then it carries a meaning that encompasses time, place, and even society. The most distinguishing feature of the modern period is the concept of space and time. The Renaissance marked the beginning of the framework that forms as modernism's foundation. The Renaissance, a time of numerous new cultural and scientific innovations, contributed significantly to the development of the Modernist movement's foundational understanding of space (Sarcan & Gürbüz, 2020).

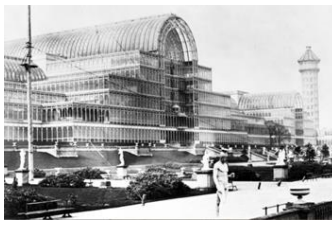
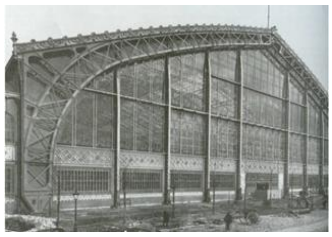
Buildings and spaces were constructed using natural, scarce materials like wood, dirt, and stone, together with constrained techniques, prior to the Industrial Revolution. This cap started to be loosened with the Industrial Revolution, and the field of architecture benefited greatly from mass production and standardization. When steel and also reinforced concrete were discovered, new building methods were developed that made it possible to increase the apertures in the walls that surround interior rooms and open up to the outside. The discipline of architecture has

benefited from the widespread use of steel. Concrete and reinforced have become more common due to the extensive usage of cement (İzgi, 1999).

Spaces have started to evolve and change due to shifting tastes and desires in light of steel, glass, and mass production, all of which are dependent on technical advancements. In his book "Programs and Manifestos in the Architecture of the 21st Century," author Conrads indicates that futurists have lost their appreciation for colossal architecture and now prefer the transitory and quick with the new age. During the Industrial Period, exhibition spaces were crucial to the creation and distribution of a new architectural style. Horeau's design of the Universal Exposition in Paris in the year 1867, Galeries Des Machines, created by Dutert and Contamin for the exhibition in 1889, also in Paris, and Joseph Paxton's construction of the Crystal Palace in steel and glass all date from the 19th century. They stand out among the century's most notable uses of steel and glass. See Table 4. In these structures, it is ensured that a space is created with only steel and that the interior and exterior spaces become whole with the transparency provided by the use of glass. In these buildings, it is made sure that a space is made entirely of steel and that, thanks to the transparency glass provides, the internal and external spaces are integrated into each other (Conrads, 1991).

Table 4

Crystal Palace, Galeries des Machines, Universal Exposition (Author, 2023).

		
Paxton Crystal Palace, 1867 (Brussat, 2017)	Dutert ve Contamin Galeries des Machines, 1889 (Atlas, 2017)	Horeau Universal Exposition, 1867 (Maison, 2023)

Structures had been created in a form that has more introspective and less related to the outside throughout times that could be broadly referred to as "classicism" before the 20th century. The weight of the building materials is one of

the primary causes of this. But as building production advanced through industrialization, new building materials like cast iron, steel, and reinforced concrete allowed for smaller cross sections, lighter structures, more delicate building components, higher transparent surface ratios, and more natural light to receive the structure. This means that are now numerous ways that spaces relate to nature (Eyüce, 2011).

Space in the Modern Period

Modern architecture came into being as a result of social, economic, political, artistic, technological, and even scientific aspects. While scientific and technological advancements brought forth certain advances, wars, political conflicts, and movements associated with the government of the time also led to economic difficulties and changes in population as a result of migration. However, despite both favourable and unfavourable circumstances, the discipline of architecture pushed structural activities and looked for new production methods. When the twentieth century is considered, new findings and concepts have appeared in philosophy, architecture, science, art, and other fields. These developments have been successful in developing by influencing one another. In terms of societal development, the 20th century was a completely different time. Social advancements were not anticipated to occur so quickly by scientists, artists, or architects. On the other side, architecture has sparked changes in technology, the economy, society, and culture.

Architecture places a great deal of importance on space. People are consistently surrounded by various spaces, and the existence of these spaces is a part of who they are. These spaces can occasionally be dreamlike realms or ones that humans have created. Although it is an unformed existence, space has a figurative existence that gives it a personality. When people start to think about space, they will likely picture a character who may represent space itself. It means that the character is both a more universal concept of space and that it contributes to an all-encompassing general atmosphere (Baghchesaraei, & Baghchesaraei, O., 2015).

Space has been handled in a variety of ways just in modernism. Compass and cartography, which were developed during the Renaissance, are the biggest innovations in terms of space. With the help of these two discoveries, the globe has

become a known entity. Social life has undergone significant modifications since the world has come into being. With new discoveries, science has altered how we view space. It might be stated that because of how quickly the modern age has developed, space has all but disappeared. Because speed is a phenomenon that resembles how visible time is in any case. The relativity of the relationships between individuals who are in velocity and those who view the event at various spatial ranges is shown by Einstein's relativity theory in the laws of physics. Even in this case, where time is used to describe the event's speed while providing context, space will be interpreted as time's transience. Since both the 19th and 20th centuries introduced a wealth of communication and transportation technology that subordinated and homogenized space, producing many imagined and metaphorical "small" worlds, everything is dependent on developments elsewhere (Mert, 2007).

The necessity for previously unbuilt structures arose at the start of the 19th century. For instance, the need for mental health facilities, public and charity institutions, and housing for employees who relocated to industrial areas that were fast developing became apparent. At the same time, Prince Albert and his supporters at this time sought to organize the first global fair, an international industrial show, and they presented plans to the leading architects of the day. None of the designs, however, were deemed adequate. Additionally, the actualization of these designs takes a very lengthy period. Joseph Paxton, a greenhouse builder, and gardener, eventually found a solution to the issue. Paxton suggested the Crystal Palace, which was essentially a massive greenhouse constructed by mixing beams and columns of the very same prefabricated cast iron with an almost totally glass wall membrane (Roth, L. & Akça, 2002). The first significant prefabrication example was completed in 16 weeks, and it is a 70 000 square-meter exhibition gallery where glass and iron are fused (İnceoğlu, M. & İnceoğlu, N. 2004).

The social lives that emerge alongside the growth of industry bear the imprint of industrial and mechanization both indoors and out. A notable illustration of this is Le Corbusier's proposal for the machine house. The creation of architectural walking paths using steps and ramps is crucial for improving the quality of the space. A tendency toward lightness and transparency in the production of spatial values has been made possible by the use of materials like glass and steel, which are based on

the swift development of technology. Whatever their purpose, glass screens, and rectangular prisms provide individuals with the spaces needed for the modern way of life (Sözen, 1996 Transportation Irmak, Ö. 2008).

In contrast to Le Corbusier's innovative concept of space built upon the free plan understanding, Mies van der Rohe, who created many designs within Germany during the 1920s, had a distinct conception of space. According to Mies van der Rohe's own words, he created the modern spaces to arrange the spatial requirements of the contemporary man, to open it up to the outside world, and to relate it with their landscape. He eliminated away with the divide between interior and outdoor space by stripping the structure down to its most basic components. In its space, everything has a distinct, fixed place. The floor is set up to enclose the space within the ceiling and also the wall, to contain all of the items in their proper places, and to provide people with the necessary freedom of movement (Tegethoff, W., & van der Rohe 1985 Transportation Irmak, Ö., 2008).

With modern space setups, the boundaries between indoor and outdoor spaces have begun to disappear. Architects adopting the understanding of modernity, by designing the movement, the static spaces based on the principle of occupancy have been replaced by the void, and with these designed spaces, they have created a fluid, intertwined, dynamic space order. However, with the advancement of technology and also material technology, much larger openings in carrier systems have started to be passed, and a wide, large, widespread, continuous and free space understanding has emerged. With the production and use of glass in larger sizes in designs, it has brought awareness of outdoor space and the relationship between indoor and outdoor has increased.

Examining of the 20th-century Architectural Approaches

With the developments experienced, a very new era has been entered in living conditions. With this period, Modern Architecture has different architectural approaches that are parallel or contradictory to each other. In addition, the thought system in Modern Architecture was reflected in the spaces as the architects of the period were reflected as the intellectuals who shed light on society and ensure the order of society.

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

Functions can denote performance, profession, duty, or task in its literal sense. It also has a wide range of definitions, such as usage, purpose, behavior, operation, or activity, depending on where the words originate. In the framework of architecture, function refers to the actualization of a notion and the determination of the structural interfaces between objects, which results in the assignment of a physical or informational function to the form's constituent parts (Z˙ ychowska, M., 2019). A design's aesthetic (beauty) cannot be reduced to a design's size, shape, and proportions; rather, it also includes the practical significance of the function served by the element or piece of architecture in question (Arenibafo, F., 2017, Winter, Aesthetics 2007). A structure is the consequence of a function if it best serves the objective for which it was designed to be employed. The most relevant type of architecture is one that derives a structure's personality, from its purpose from the reason it was designed or constructed (Z˙ ychowska, M., 2019).

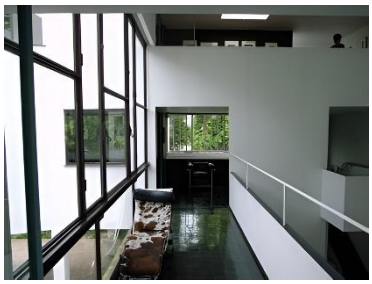
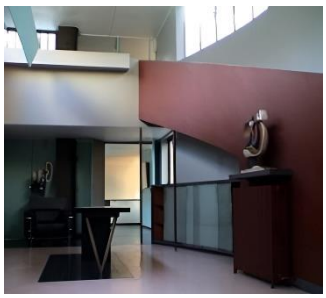
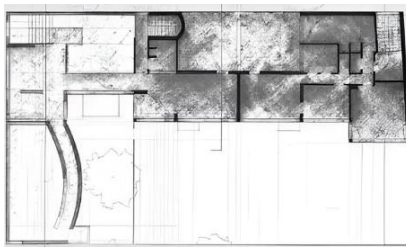
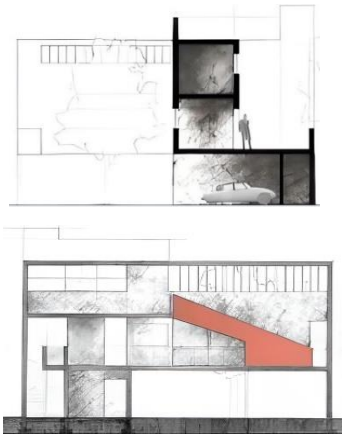
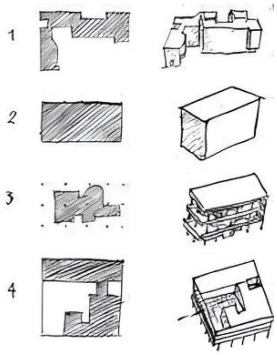
A building's layout, as well as flaws in the comfort, color, and shape of its spaces, are all examples of functional deficiencies. The architect must take functionality into account in the structure design given how important the situation is.In addition, it is architecture's fundamental purpose to maintain a structure's integrity while balancing form and function (Schumacher, T., 2002).

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 (Nia, H., 2020). 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, Corbusier's concept of

form which is Form is Form that is more significant than Function which is why form is a description of art, of mathematical concepts, and also of proportions that are harmonized with the entire (Trisno, 2019). The Villa La Roche structure, built in 1923 by Le Corbusier, generally known as the purist architect, is considered to reflect functionality in a balanced way shown as in Table 5. The ground level is freed with the openings in the structure of The Villa La Roche, which was built on the pilotis. This construction technique provides the user with the opportunity to roam the ground code of the building, and at the same time creates a semi-enclosed space. The design clearly demonstrates the integrity of the interior and exterior as well as the horizontal window openings and large glass surfaces that are defining characteristics of the modern period.

Table 5

Le Corbusier, Villa La Roche (Author, 2023).

Villa La Roche, 1923, by Le Corbusier		
		
Villa La Roche (ArchDaily, 2021)	Interior Space Design (ArchDaily, 2021)	Interior Space Design (ArchDaily, 2021)
		
Plan (Burdick, 2012)	Section (Burdick, 2012)	Design Phases (Vandenhende, 2015)

Modernism's evolution was significantly influenced by the prominence of functionalism in architecture. The concept of the form used in the language of architecture is aimed to explain the external appearance of the buildings and the concept of function and spaces. Beginning with their definitions, form and function and their relationship to one another show the significance of the manifestation of architectural form.

Futurism

The futurist idea was one of the cultural upheavals that aimed to encompass all forms of artistic creation. According to Argan, it was technically the first movement that could be referred to as Vanguard, and it came from an Italian movement (Argan, G., 1992).

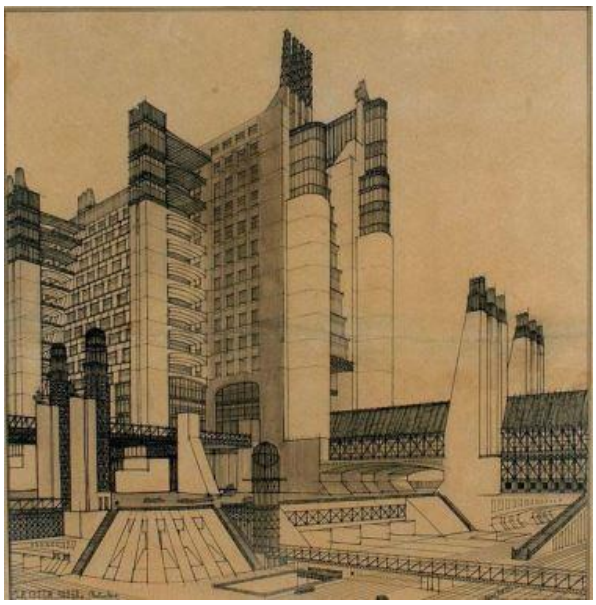
On February 20, 1909, the Paris daily Le Figaro issued a manifesto written by the Italian writer and publisher Filippo Tommaso Marinetti, which served as the first official declaration of futurism. In order to achieve his goal of rejecting historical art and embracing change, uniqueness, and invention in culture and society, Marinetti coined the term futurism. The automobile's cutting-edge technology and the elegance that came from its speed, power, with movement, were exalted in Marinetti's manifesto. He demanded the wholesale rejection of conventional values and the abolition of cultural institutions like museums and libraries while exalting violence and conflict. The rhetoric of the manifesto was fiercely bombastic; its strong tone was meant to incite public outrage and stir up debate (White, J., 2023)

The aesthetic and social movement known as "Futurism" in the 20th century gave rise to the term "futuristic architecture." The first recognized contemporary art movement to come from a united Italy is futurism (Gardini, A. 2014 Transportation Asim, & Shree, 2018). High speed, technological progress, the place of youths in society, and concomitant violence were all themes that came up. People became fascinated with transportation innovations like cars and airplanes as they were introduced into society. They got a sense of what it might be like to live among such appealing media, like industrial cities (Asim, & Shree, 2018).

In order to discuss Futurism, Giedion reproduces the architect Antonio Sant' Elia's drawing from 1914, which depicts a skyscraper with traffic channels and elevator towers intersecting at various levels (Hardy, 2011). See in Figure 3. Despite the fact that this involves actual, mechanical movement, futurist paintings sought to show like stroboscopic photographs that *"objects in motion multiply and distort themselves just as do vibrations, which indeed they are, in passing through space."* (Hardy, 2011).

Figure 3

Antonio Sant' Elia sketch, Housing with external lifts and connection systems to different street levels from La Città Nuova, 1914 (Goryunov, Goryunova, Murgul & Vatin, 2015).



In contrast, elevators should be visible from the outside of buildings, such as iron and glass snakes, according to futurists, while staircases should be kept out of sight. Because the elevator serves as one of their favourite technological indicators, they believe it should be prominently displayed. Futurist architects proclaimed their resistance to cubic and pyramidal forms, as well as rectangular and horizontal lines. Additionally, futurist architects objected to ornaments with pictures and sculptures. The new city, according to futurist architects, should be enormous, busy, and dynamic in every way. Architects compare the city to the site of construction and the street to an "abyss."

Futurist architects contended that the modern house can likewise be viewed as a massive machine. Briefly stated futurists oppose fashion architecture, classical, decorative, monumental constructions, preserving and reconstruction of historical sites, rectangle, and horizontal lines, cubical and pyramidal forms, bulky, massive, and durable structures, as well as those that are complex, costly, dysfunctional, and incompatible in modern techniques and materials (Sarıgül, A. 2008).

Expressionism

The word "expressionism" is derived from the Latin term "exprimere" and the French word "expression" (Irak, 2008). In addition to being a literary theory, expressionism is also a term used to describe the work of young French artists. It came to represent all painters who reject impressionism by the end of 1911. This movement's lack of a philosophy that is universally accepted or a group working toward a common objective is its most distinguishing feature. Instead, a current that results from independent people interacting can be described (Batur, 2009).

The expressionists employed 19th-century symbols in "movement and speed" as a guide for their ideas and creations. By fusing various interpretations with the adjustments and modifications that mark the return of the age, the concept of movement as it relates to architectural design and speech has been utilized. Urban life has been rebuilt as a result of the restructuring of time and movement concepts across all domains, as well as the revolutionary power of science and technology. The increasing use of automobiles and the transportation network, industrial output, and technological and scientific discoveries have all contributed to an ongoing emphasis on the role of emotion in human existence. The physical surroundings and social life have altered as a result of all these advancements, which have also produced a dynamic lifestyle process that is constantly accelerating (Kaya, 2005).

Expressionist architects were having the chance to experiment with new shapes for structures that required huge volumes and novel uses up until 1914 thanks to the industrial revolution. After 1918, architects, particularly in Germany, experimented with the design of an irregular form that would have a powerful impact. Most of them stayed in utopian projects (Melvin & Şahin, 2009).

The form takes center stage in expressionist architecture and is heavily emphasized. By using a deductive method, the understanding of sculptural with expressive forms controls the entire design. The architect used the shape to communicate what he desired to express about the topic and his innermost thoughts. Although the form may not always follow function, the forms for the key functions within the structure were notable for their exaggeration. The sculptural shape has thus become a key element in determining the design's content in Expressionist buildings (Keskinalemdar, 2011).

Erich Mendelsohn's Einstein Tower in Potsdam (1919-21), Rudolph Steiner's Goetheanum in Dornach (1925), Frank Lloyd Wright's Guggenheim Museum in New York (1943-59), Le Corbusier's Ronchamp Chapel (1951-55), Eero Saarinen's TWA Flight Center in New York (1956-57), Jorn Utzon's Sidney Opera House (1957-73) can be counted among the examples of the expressionist approach. See Table 6. Each of the aforementioned structures is unique; they are typically curved, irrational, emotional, thrilling and exuberant, dynamic, and have high-quality forms (Benian, 2010).

Table 6

Expressionist Buildings (Author, 2023).

Einstein Tower (1919-21) Erich Mendelsohn	Goetheanum (1925) Rudolph Steiner	Guggenheim Museum (1943–59) Frank Lloyd Wright
		
(ArchDaily, 2021)	(Buchard, 2021)	(ArchDaily, 2021)
Ronchamp Chapel (1951–55) Le Corbusier	**TWA Flight Center (1956-57) Eero Saarinen**	**Sidney Opera House (1957-73) Jorn Utzon**
		
(ArchDaily, 2021)	(Arkitektuel, 2021)	(Craven, 2018)

De Stijl

The early stages of De Stijl's evolution were significantly influenced by Cubism and its abstracting methods (Holdren, 2016). De Stijl, a significant modernist movement at the beginning of the twentieth century, was distinct from previous movements in that it existed for only 14 years and had a complete organizational structure, and had no definite organizational themes. However, it had a significant influence on later modern creative design, architectural design, interior design, etc. It was regarded as one of the foundations of "Classic Modernism" (Qin, 2015).

The approach started as a periodical that aimed to improve the general public's access to art. The publication, which mostly showcased the creations of designers, visual artists, and other artists, supported the integration of the arts. The artists believed it was essential to purify diverse disciplines (sculpture, painting, architecture, etc.) by knowing them at their most basic levels, allowing them to combine these arts, effectively combining them in a well-balanced relationship (Holdren, 2016). De Stijl was against all forms of ornamentation and advocated for a more rational, cogent use of modern materials and technologies (Doorman, 2003).

In order to organize architectural design according to specific standards, De Stijl aims the "New Architecture" technique. The new architecture should stress space units as pieces propelled outward from the central point of the cube by centrifugal force, transforming the traditional box into architectural products constituted of masses in various positions, heights, and sizes. De Stijl's approach is a design strategy that achieves dynamic, unique, and complete abstraction. The new architecture suggested architectural forms which had been monumental and asymmetrical, economical, and free of stylistic imitation and binding. These proposals shaped modern architecture's general forms (Nia, H. & Rahbarianyazd 2020, Birol, 2006).

De Stijl is primarily characterized by a pure universality achieved through its reduction of components to their most basic forms and colours, especially through the use of both vertical and horizontal lines combined with black, white, and primary colours (Blotkamp, 2001).

Mies van der Rohe had been one of the movement's most influential proponents, and De Stijl continued to have a substantial influence on architecture after 1931. The Rietveld Schröder House, that one structure entirely constructed in accordance with De Stijl ideals, was erected by Rietveld between 1923 and 1924 (White, 2003). When examined in terms of internal and external interactions, Schröder House distinguishes itself from preceding architectural forms in a blatant way. This house includes plastic building factors of modern architecture, including time and space, colour, function, light, surface, mass, and material Schröder house has an open system thanks to the removal of load-bearing walls and the internal-external separation, and it also offers elements that are both economical and practical. Rietveld supports that colour is a direct and organic manner of transmitting relationships in space and time, not a tool for decoration (Frampton, 2007). The vertical and horizontal harmony of the colours, geometric shapes, and materials support the house, which was designed for the cube's fragmentation fiction (Leuthäuser, 2001). See Table 7.

Table 7

Gerrit Rietveld's Schröder House (Author, 2023).

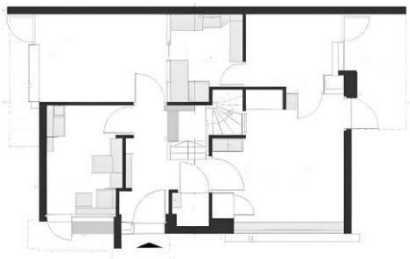
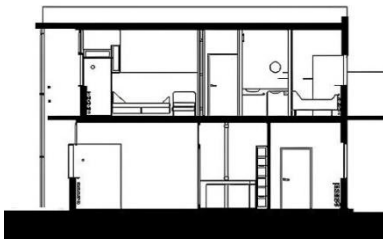
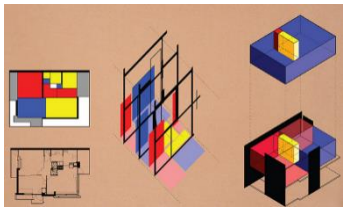
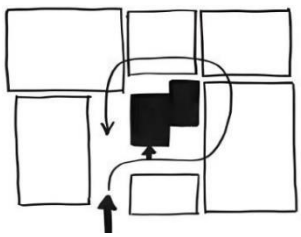
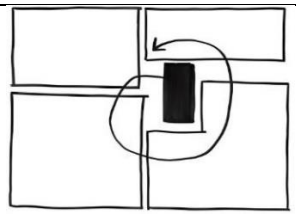
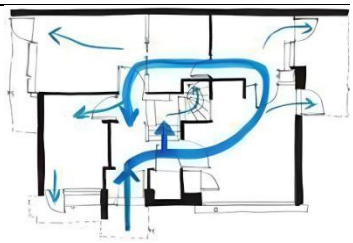
Schröder House (1923-1924)		
 Plan (Wordpress, 2021)	 Section (Great Buildings, 2021)	 Design Phases (Zorn, 2017)
 Living spaces formed around spiral staircases. The staircase connects both levels of the building. (Merchant & Shi & Ru & Ratajczak, 2012)	 It shows the spatial organization of the upper floor. The stair area is shown as a box that can be accessed from other areas on the floor. In addition, the upper level is divided into four main areas wit access to a three-post balcony. (Merchant & Shi & Ru & Ratajczak, 2012)	 Circulation axis downstairs. Every downstairs area has acces the outdoors. (Merchant & Shi & Ru & Ratajc 2012)

Table 7 (Continued)

		
Schöder House (Wordpress, 2021)	Interior Space Design (Arkitektuel, 2021)	Interior Space Design (Bay, 2017)

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. At the Declaration for the Bauhaus (1919), which imagined a utopian trade guild fusing the arts of sculpture, painting, and architecture into a unified creative expression, Gropius outlined this idea for a merger of art and design. Gropius created a craft-based curriculum to produce designers and craftspeople capable of producing practical and attractive products suitable for this new way of life (Griffith W., 2000).

The Bauhaus School incorporated both academic and practical instruction. Since the beginning of the school, an experiment a research-based strategy intended to develop expertise via practice has played a key role (Reshetnikova, T., 2020). 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. For an initial time, Arts & Crafts and Basic Design were taught together in one institution at the Bauhaus (Tietz, 2000 Transportation Karaca, 2021).

With the advent of a Department of Architecture beneath H. Meyer in 1927, the pedagogical program run by Johannes Itten from 1919 to 1922 while László Moholy-Nagy in 1923 to 1928, continues to gain ground in the fields of architectural and industrial design (Forgacs, 2017, Wingler, H. & Sambricio, 1975, Frampton,

2020, Transportation Ufuklar, 2019). By avoiding the mediocrity that industrialization brought, Gropius and his partners established a new architecture with a design environment. Gropius, W. (1919), the Bauhaus manifesto and program, states that the perfect structure should be created by fusing all the handicrafts (Ufuklar, 2019).

The Bauhaus, which operated between 1919 and 1933, was shut down by the Nazis in the year 1933. It had been established in Weimar in 1919 and had since moved to Dessau, Germany in 1925, and Berlin in 1932 (Gieselmann, 1996). Hannes Meyer, the dean of the architectural department, was assigned to the administration of the school after its founder, Walter Gropius, left it in 1928. Mies van der Rohe then followed in 1930. Rohe had to move to a school in Berlin and then close school within a year due to pressure from the Nazi Party, which had begun to gather strength (Alsaç, 1997, Transportation Benian, 2010). Those artists who left it travelled to Europe and America, where they had a major impact on the school's expansion (Bulat, S., Bulat, M., & Aydın, 2014).

The complex, designed in 1925–1926 by Walter Gropius with Adolf Meyer, is a tangible example of the Bauhaus philosophy, which attempts to develop modern construction technologies with the framework of the requirements for the chosen material and training program. According to their intended uses, Gropius divided the Bauhaus building's parts into separate units that intersected on several axes. Regarding the practicality of this manifesto, resulting from the fusion of many arts, the building has a significant impact (Frampton, 2020). The structure lacks a centralized or linear viewpoint. To understand the overall design of the complex as well as the building ends and transition links at various levels, one must stroll around the group of buildings. The three-story, glazed workshop section and the building housing the vocational school are remarkable due to their workshop windows, which run along three levels of lines that are horizontal. One of the key components of the complex is a five-story studio structure with a noticeable balcony. The two-story structure housing the administrative offices serves as a link between the vocational school and the workshop wing (Ufuklar, 2019). See in Figure 4, 5.

Figure 4

Bauhaus building facade, 1919-1933 (Żychowska, M., 2019).

Figure 5

Bauhaus building back elevation., 1919-1933 (ArchDaily, 2022).

The Bauhaus movement, which promoted a simple, plain, rational architecture, based its principles on fundamental shapes. The philosophy of the Bauhaus also served as the inspiration for modern industrial architecture. Gropius reorganized the curriculum of the school to place an emphasis on fundamental design principles and articulated his objectives in multiple manifestos and publications (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. Functionality, programmatic determination, structural expression, faith in technology and the industrial revolution, abstract forms devoid of ornamentation and historical allusions, and a positivist with utopian belief in discovering enduring

solutions to structural and urban problems, among other ideas, are the principles that, according to Dostoğlu, best characterize the Modern Architecture movement Dostoğlu, 1984 Transportation 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 Transportation Falcetta, J., 2007). Point of view was now positioned subjectively within the frame rather than objectively outside of it. The observer was forced to change from his former privileged perspective of objective omniscience to that of ambiguous and fluctuating contingency set inside concurrent possibilities as a result of several points of view. The artist's job was to penetrate into reality by choosing and synthesis the components that were recalled, seen, and projected, broken into incomplete pieces and then put back together again (Galenson, D., 2001).

Cubism was one of the trends in art that challenged the Naturalist conception of art and introduced a fresh perspective on form. They subscribed to the principle of rejecting the apparent reality. They behaved rationally and analytically, in contrast to German expressionists who tried to develop topics and forms through emotions (Krausse, A. 2005).

This understanding is based on the principle of separating the object into parts and putting it back together with a different interpretation. In the process of reassembly, two different methods are applied. These; Geometric pieces obtained from the analysed shapes are either sprinkled on the canvas or stacked on top of each other. As a result of both methods, the object loses its original form and becomes unrecognizable, and turns into a new object consisting of a series of interlocking geometries. Based on this, in cubist painting, the same objects are drawn on top of each other with different viewing angles, emphasizing the relativity and variability of time and space. See in Table 8. In addition, 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).

Table 8

Fragmentation and Analysis of Objects (Sezer, 2009, edited by author).

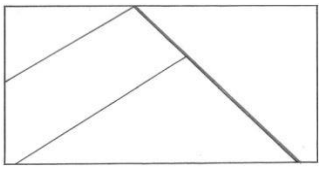
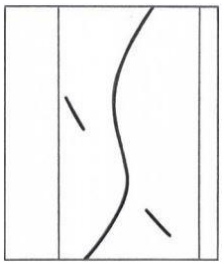
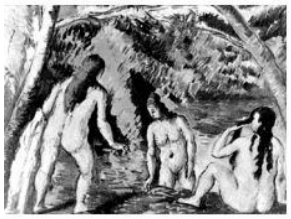
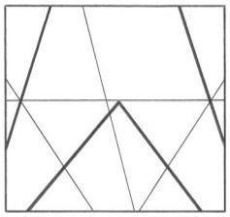
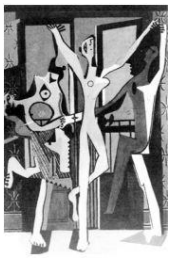
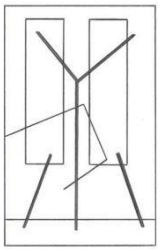
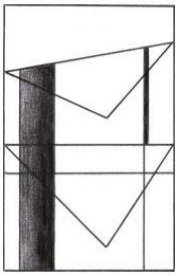
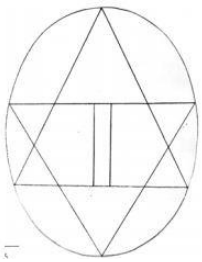
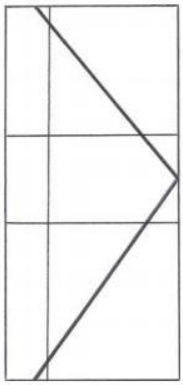
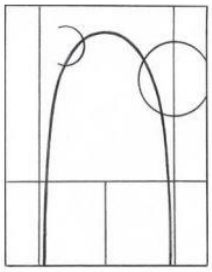
 P. Picasso “Guernica”	 Analysis of “Guernica”
 P. Picasso "Girls of Avignon"	 Analysis of "Girls from Avignon"
 Cezanne “Women Washing”	 Analysis of “Women Washing”
 P. Picasso “Three Dancers”	 Analysis of the “Three Dancers”
 P. Picasso "Crying woman"	 Analysis of the "Crying woman"
 P. Picasso “The Pipe Smoking Man”	 Analysis of the “The Pipe Smoking Man”

Table 8 (Continued)

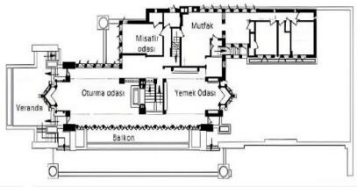
 Braque “Violin and Palette”	 Analysis of the “Violin and Palette”
 J. Gris “Mother and Daughter”	 Analysis of the “Mother and Daughter”

The Cubists, according to Apollinaire, preferred "designed actuality" over "the truth that the vision". As fluid as its use of space, Cubism was a project that changed over time. The farther it veered from early works such as Picasso's Demoiselles d'Avignon (1907), the more abstraction and universality it attained (Haftmann, 1960 Transportation Falcetta, J., 2007). Picasso took things a step further by highlighting the intricate network of interactions between spaces and volumes as well as the shaky bond between solidity, and transparency, turning their ambiguities become contradictions and destroying any pretense of spatial coherence (Cottington, 2004, Transportation Diamond, 2011). Cezanne's depiction of a pipe, Picasso's depiction of a nose, Leger's wheel, and Gris's forms of the bottle are all similar to what Le Corbusier attempts to find in a cube. Le Corbusier attempted to move this novel concept from the realm of art to that of architecture in this situation (Gardiner, 1985). According to Le Corbusier, geometry can be used to find solutions to issues in modern architecture. Le Corbusier claims that since light is what the human eye sees, shadows and shines indicate shapes. Additionally, Le Corbusier adopted the cubist painter Cezanne's creative philosophy by claiming that the sharpest shapes made visible by light are cubes, cones, cylinders, and pyramids (Gardiner, 1985). Besides,

Frank Lloyd Wright also was affected by cubism, and his first true masterpiece, the Robie House, built outside of Chicago between 1908 and 1910, is the best example of this revolutionary use of architectural space (Sherrye, 1985 Transportation Wadsworth, S. 2011). In this building, the concept of cubism is not only limited to the rectangles that make up the house but also manifests itself by reflecting the integrity of the interior and exterior. Therefore, the main criterion in the design of the housing is to ensure the creation of an integrated design concept. See Table 9.

Table 9

Frank Lloyd Wright's Robie House in 1907-1909, (Author, 2023).

Robie House (1907-1909)		
		
Robie House (Vertazontal, 2012)	Interior Design (Levere, 2019)	Interior Design (Levere, 2019)
		
Plan (Heinz & Corbis, 2010)	Section (Heinz & Corbis, 2010)	Design Phases (Heinz & Corbis, 2010)

Purism

Purism, stated by Carol S. Eliel, originated in 1918 as a reaction to the both social and artistic circumstances of the period (Eliel, C., Ducros, F. & Gronberg, T. 2001 Transportation Simic, 2006). Amédée Ozenfant and Le Corbusier, the movement's founders, recognized the need for physical and aesthetic clarity and purification of the world that had been ravaged by the war. Therefore, they set up the Purism movement in painting, which incorporated machine aesthetics, clean and simple geometric shapes, and the spirit of old classicism (Simic, 2006).

Their association resulted in the foundation of the movement they called Purism and the publication L'Esprit Nouveau, which served as its vehicle for dissemination. Le Corbusier first learned about the post-Cubist avant-garde through Ozenfant, who also introduced him to some of its key figures, such as the painter Fernand Leger. Le Corbusier succeeded in reuniting the broken universe of cubist paintings into polished creations of artwork that were machined with mathematical in their accuracy. During the 16th through the 19th centuries, the more noble aspects of nature held the position in still-life paintings that was later raised by purism to mass-produced items of daily life (Slutzky, 1987 Transportation Shannon, G. & Shannon, M., 2020). These key figures frequently occur in their Purist artwork and were closely related to Le Corbusier's future construction. The plans, sections, with facades on his interiors and structures, were influenced by the shapes, colours, and spatial arrangements of his artwork (Shannon, G. & Shannon, M., 2020).

In contrast to futurism and Neo Plasticism, Purism has been more steady, symmetrical, and deductive due to its use of pure and geometrical shapes. 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 Transportation Birol, 2006).

Le Corbusier with Mies van der Rohe are two prominent supporters of purism. In all of his works, Le Corbusier frequently used abstract fundamental forms (Birol, 2006). Le Corbusier attempted to construct his ideas in accordance with the five guidelines he established for Modern Architecture in his 1926 paper "Five points towards a new architecture." These principles include:

• By rising onto the pilots, the structure preserves the integrity of the ground and achieves independence from it.
• The building and the terrace roof are whole in and of themselves.
• Designing using a free plan scheme.
• By taking back the reinforced concrete columns, the free facade and facade layout are liberated.

• With the horizontal band's window, it is intended to maximize the amount of natural light entering the building (Bektaş, E., 2022).

Ludwig Mis van der Rohe, who is another Purism approach pioneer, used Purism's tenets in every one of his constructions. Rohe has always declared that he's a supporter of simplicity by including the phrase "Less is more" in his structures. The purist principles were used in the design of a vast number of structures, many of which are regarded as the groundbreaking works of the twentieth century. Some of them are Le Corbusier's Villa Savoye (1929-1931), Swiss Pavilion (1930-1932), Unite d'Habitation (1945-1952), By Ludwig Mies van der Rohe's Farnsworth House (1950), Barcelona Pavilion (1929), Crown Hall (1956) can be counted as the Seagram Office Building (1958). See Table 10.

Table 10

Purist Buildings, (Author, 2023).

Villa Savoye (1929-1931) Le Corbusier	Swiss Pavilion (1930-1932) Le Corbusier	Unite d'Habitation (1945-1952) Le Corbusier
 (Leiva, 2023)	 (Naja, 2023)	 (Kroll, 2023)
Farnsworth House (1950) Ludwig Mies van der Rohe	**Barcelona Pavilion (1929) Ludwig Mies van der Rohe**	**Crown Hall (1956) Ludwig Mies van der Rohe**
 (Perez, 2023)	 (Kroll, 2023)	 (Chicago Architecture Center, 2023)

Purism, like any architectural movement, eventually brought its opposing discourses to the forefront and gave rise to post-modernism, a decorative style. Due to this, it may be claimed that Purism, an approach of architecture that has declined

in recent years due to the rise of pluralist approaches, should still be considered important today (Benian, 2010).

International Style

Johnson Philip Cortelyou, an American architect, created the international style, commonly referred to as International Modern or American Rationalist European Architecture. Johnson Philip Cortelyou belongs to a second generation of notable American architects, which also included Henry Hitchcock, Paul Rudolph, Kevin Roche, and Eero Saarnen. American architects had a reputation for being formalists, refiners, and redefinitionists. Frank Lloyd Wright, Mies Van der Rohe, Le Corbusier, and others made up the first generation. Johnson coined the phrase "International Style" to describe what they saw as significant changes in modern architecture that were moving toward designs for buildings that were straightforward, unadorned, and explicitly displayed their structural elements using contemporary materials.

According to Johnson, "*These trends, if adopted by architects everywhere, would result in a Modern Architecture bereft of traditional materials and regional character.*" (Prucnal-Ogunsote, 2001, Transportation Mgbemena, E. & Okonta, 2018). 30-37. Concepts of similarly universal architectural ideas were inspired by universal goals for all humankind. International fashion declared its independence from the unique constraints of space, time, culture, and climate (Mgbemena, E. & Okonta, 2018).

"International style" and minimalist aesthetics conception Around 1900, there was a lot of debate in Europe about the function of architecture and designers in society. Every good architect is also an outstanding poet, according to Frank Lloyd Wright. Wright must be a superb, sincere interpreter of his period. There was growing criticism of ornament usage overall as well as ornament overuse. The nineteenth-century architecture is harshly attacked from a variety of angles because it employs modern technologies but does not fundamentally relate to them. It was agreed upon during these conversations that it was vital to employ fair materials that weren't embellished with plaster or paintings. According to architects, a building's beauty is found in its usefulness rather than how it is decorated. The proponents of

this concept were Mies van der Rohe, who stated that "Less is more," Frank Lloyd Wright, who remarked that "Five lines where three were enough is foolishness," Adolf Loos, who wrote a book titled "Ornament and Crime" and others (Proskuryakov, Bohdanova, Y. U. & Yuriychuk 2018).

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, H. & 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). The aesthetic tries to appease the desire for honesty, simplicity, and simplicity, especially through the Second World War. It was chosen as the best method for new construction projects after World War II since it aided in quick production. One can include Taut, Corbusier, Max, Rohe, and Gropius among those who pioneered this method, which entirely rejects eclecticism (Benian, 2010).

Le Corbusier's Citrohan House (1922), Gropius' Bauhaus Design School in Dessau (1925-26), Mies van der Rohe's German Pavilion at the Barcelona World Exhibition (1929), Richard Neutra's Lovell Health House in Los Angeles (1927-1929) can be counted among her pioneering works (Erenler, 1997). See Table 11.

Table 11

International Style Buildings, (Author, 2023).

Citrohan House (1922) Le Corbusier	Bauhaus School (1925-1926) Walter Gropius
 (Manaugh, 2008)	 (Żychowska, M. 2019)
Barcelona Pavilion (1929) Mies van der Rohe	**Lovell House (1927-1929) Richard Neutra**
 (SouthET, 2023)	 (Kroll, 2023)

Due to the restrictions and limits of the International Style, structures have been created with little regard for aesthetics and social factors. In a way, the social life was imprisoned in the prefabricated, terraced roof, and grid system blocks generated by the buildings, which were built without considering their relationship to the environment. The cities that these constructions produced also had a severe psychological impact on individuals. Due to this, the approach, which was eventually realized as monotonized within cities, became able to remain popular until the 1960s.

The style's rational and straightforward forms, which enable quick and affordable construction, have pushed architects to new searches, and over time, movements including Brutalism, Expressionism, and Postmodernism have developed (Gieselmann, 1996, Erenler, 1997 Transportation Benian, 2010).

Organic Architecture

Although the term "organic" is often used as a word to describe something that happens spontaneously, it has a new meaning when used in architecture. Romanticism is an artistic, literary, and philosophical movement that began in the northwest of Europe in the late eighteenth and early nineteenth centuries and spread to other regions of America and Europe. Its roots can be found in organic architecture knowledge. To the rationality of contemporary wisdom, this approach was a response. All organic formations are dynamic, according to this theory (Mirzaei, 2013).

Louis Sullivan (1856–1924) originally used the term "organic architecture" in his design (Fuller, 1988 Transportation Zbašnik-Senegačnik & Kuzman, M. 2014). The word "organic" was defined by Sullivan in connection to the words "organism," "structure," "function," "growth," "development," and "form." All of these terms suggest the presence of a driving force that is alive as well as a structure or mechanism that allows for the manifestation and operation of that force (Fuller, R. 2009, Transportation Zbašnik-Senegačnik & Kuzman, M. 2014). According to Fuller, *"the function of the parts must have the same quality as the function of the whole if the work is to be organic."* (Fuller, 2008 Transportation Zbašnik-Senegačnik & Kuzman, M. 2014). Sullivan's "form follows function" term is the basis of the main idea behind the organic design (Zbašnik-Senegačnik & Kuzman, M. 2014).

Frank Lloyd Wright is the most significant architect who created and personified organic architecture. Wright attempted to define organic architecture in his 1914 article titled "In the Cause of Architecture": it is an approach to architecture that grows from the inside out in accordance with the laws of existence. The real meaning of a building, in other words, lies in the interior, according to the architectural approach known as "organic architecture." With organic architecture, the interior of the building takes precedence over the exterior. In organic architecture, a structure is planned so that the actions of its users are brought to the fore, thus the interior is essential to the building's creation, rather than being formed as a combination of volumes with varied functions.

The design of a structure should be organic, like in nature, use natural forms and suitable colours in harmony with nature, show the materials' inherent characteristics, and have a distinct personality separate from trends, according to Wright's principles. The phrase "form and function one one" was added by Frank Lloyd Wright to Louis Sullivan's "form follows function," and he used nature as the best illustration of integration (Yeşilyurt, 2008).

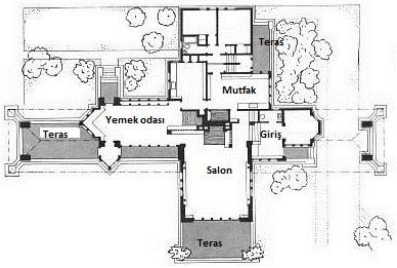
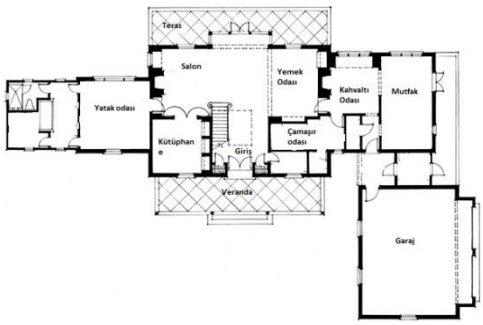
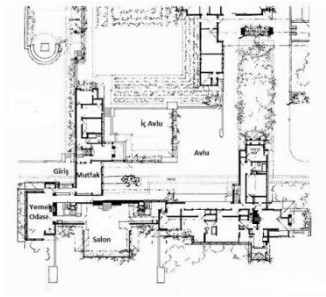
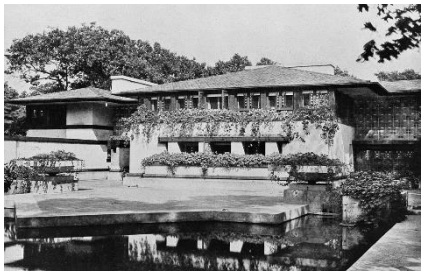
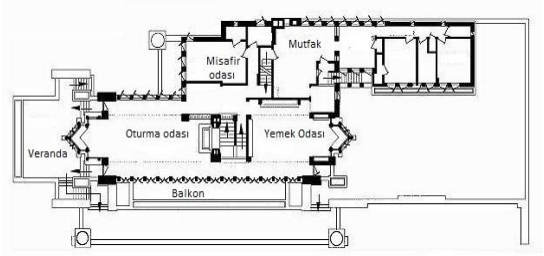
- Frank Lloyd Wright stated the following design tenets of Organic Architecture in 1908:
- By rejecting the ideas of simplicity and design, people can express their personalities in every possible way through art.
- The architecture is organic, just like in nature.
- The use of appropriate colors, natural shapes, and their harmony.
- Reflecting the equipment's nature as it is.
- The structure has a distinctive personality that defies characterization (Hasol, 2014).

An essential component of Wright's notion of organic building is the nature of the materials. Every material, in his view, possessed a fundamental quality that needed to be respected and upheld via appropriate and honest use. Therefore, the wood had to be used as wood and not painted but the richness and texture of the wood revealed what wood is actually made of. Additionally, materials like stone, steel, concrete, brick, etc., have to be employed according to their fundamental characteristics (Dahlin, K., 2018).

Designed by Wright and a group of young Chicago architects, Praire Homes has a strong horizontal plan with its landscape-oriented design. Wide eaves roofs, windows, walls covered with wood horizontally, and garden walls are the houses of the first period of architectural life, which is called organic architecture. See Table 12.

Table 12

Praire Houses, Frank Lloyd Wright, 1902-1911, (Author, 2023).

The Willits House (1902)	 (Architecht Zone. 2018)	 (Caulfield, 2022)
Martin House (1904)	 (Southern Living House Plans, 2021)	 (Cheney, 2023)
Coonley House (1907-1911)	 (Great Buildings, 2021)	 (Cresswell, 2008)
Robie House (1907-1909)	 (Heinz, 2010)	 (Vertazontal, 2012)

Brutalism

After World War II, between the 1950s and the mid-1970s, the brutalist architectural movement grew in popularity and quickly expanded over the globe. Brutalism had a significant part in the development of modern architecture during that time. However, despite the modernity and invention that this era is known for in both art and architecture, it's unexpected that architects are paying more attention to historical and monumental buildings (Imani, E. & Imani, S. 2021).

The aesthetics of Le Corbusier's residential building in Marseilles from 1952 and using of the phrase "béton-brut" to describe buildings built of raw concrete form the basis of brutalism (Sroat, 2005). Two "Brutalisms" have been noted in the historical literature on architecture. One of these courses was taken by Le Corbusier and his structures, particularly those completed after the year 1950; the other one was taken by those who followed Smithson, whose Brutalism affected their ideas more in the realm of intellectual thought under the moniker of "New Brutalism" than in the built environment. But the representation of a building's structure, materials, and functions, as well as the use of materials for their unpretentious honesty and natural, "rough" appearance, were commonly featured by the two ideas (Akyol, A., 2016).

Brutalism is an approach to architecture that is similar to modernism in that structures must follow the purpose of the form, or else architects ought to pay little attention to ornamental facades and make buildings that just resemble them (Imani, E. & Imani, S., 2021). The significance of brutalism is determined by how it interacts with its citizens; the reasoning is clear. For instance, it is simpler to recognize a wall made of concrete as a wall than one that is covered in tiles or wallpaper, and using a ladder to climb from level one to another is typically more efficient than using a beautiful spiral staircase. In other words, as little conceptual "distance" as possible exists between the material with its function in brutalism. Additionally, people are connected to the construction of the building by the "rawness" of the materials utilized (Alfirević, Đ. & Simonović-Alfirević, S. 2017 Transportation Imani, E. & Imani, S., 2021).

The term "brutalist architecture" was not coined by American architectural critic Reyner Banham, although he undoubtedly popularized it. In Banham’s 1955

article the Architecture Review, Reyner Banham said that Brutalist structures had four key codifying qualities that served as their defining traits (Banham, 1996 Transportation Al-Najjar, S. & Al-Azhari, W., 2020). Which are:

- Formal, axial layouts that display the fundamental structure are common in brutalist architecture.
- In brutalist architecture, materials were used in a clear and open manner. Concrete was employed as a building material in its purest form, devoid of any paint, treatments, and even whitewash, which was a characteristic feature of other Modernist structures. However, not all Brutalist structures are made of concrete or Betun Brut; in many nations, other construction materials, like brick or stone, are also utilized, and the characteristics of this approch may still be seen there with the same frankness in the material choice.
- All building equipment is treated honestly thanks to the usage of pipes and other obvious conduits. There is nothing to see other than the interaction of spaces; the structures are transparent in terms of their construction and operation. The use of pipes with other conspicuous conduits ensures that all construction equipment is handled fairly. The structures are translucent in terms of their design and operation; the only thing visible is the interaction of spaces. Frampton, 2020). See in Figure 6.
- Brutalist buildings are typically built using recurrent modular components that are articulated clearly and grouped together to form masses that symbolize various functional zones. This is primarily visible in Boston City Hall's renowned Brutalist structure. See in Figure 7.

Figure 6

Sheffield University extension, 1953, Alison and Peter Smithson (Goodwin, 2020).

Figure 7

Boston City Hall, 1963-1969, Kallmann McKinnell & Knowles (Architectuul, 2023).

The Pompidou Cultural Center by Richard Rogers and Renzo Piano (1977) and the Lloyd's Office Building by Richard Rogers (1986), both of which are instances of High Tech, are the most remarkable manifestations of the approach in recent years. See Table 13. In these structures, which are criticized for resembling an oil refinery, installations, and stairs are placed on the facade so that they can be

easily perceived. In the Pompidou Center, besides these, the structure and some functions can be easily perceived from the outside (Hasol, 2014).

Table 13

Brutalist Buildings, (Author, 2023).

Centre Pompidou (1977) Richard Rogers-Renzo Piano	Lloyd' s of London (1986) Richard Rogers
	
(Arkitektuel, 2023)	(Crook,2019)

Sustainability

Hans Carl von Carlowitz, a German scientist and forester, used the word sustainability for the first time in a book titled Sylvicultura Oeconomica in 1713 (Heinberg & Lerch, 2010). The terms "sustainability" and "sustainable" mean being able to build and maintain environments where people and nature may coexist in a way that satisfies the economic, social, and other needs of both the present and future generations (Office of the Federal Register, 2009 Transportation Fiksel, J. & Eason & Frederickson, H., 2012). Sustainability is a manner of being where social, environmental, and economic elements are optimized while taking indirect and long-term effects into account (Litman, 2010).

The threat of environmental contamination and the depletion of natural resources has been brought on by the rapid rise in global population and consumption, as well as technological advancements. The idea of sustainable development has been viewed as one that stops social and environmental advancements while providing economic benefits to the raw material processing that began with the industrial revolution and continues now. The relationship between the environment, the economy, and economic growth has been revealed, and the industrialization sector became interested in environmental issues, according to a

report by the future-focused Club of Rome, which was issued with the Massachusetts Institute of Technology. Environmental pollution, nutrition, raw materials, environmental population, and production were the five topics that were the focus of the study. It has been stressed that the lack of raw materials with problems with the environment could lead to humanity's extinction if the process of industrialization continues under the existing circumstances (Meadows, D. H., Meadows, D. L., Randers, J. & Behrens III, W. 1972 Transportation Duran, 2018).

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. Throughout history, there has been and will always be a relationship involving man and the environment. These relationships increased, and it can be observed that human actions have proven detrimental to nature, especially since the industrial development that occurred in the 19th century. Scientists were not unaffected by this, which demonstrated the need for this kind of safety measure. 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. Examples of these organizations and associations include the British Ornithologists' Association (1869), the first non-governmental organization (NGO) (1892), the Swiss Nature Conservation Society (1909), the Natural Reserves Promotion Society (1912), and the American National Parks Act (1916). After the republic was proclaimed in 1923, environmental issues in Turkey were covered by the legal system (Eş, 2008).

The panel on the path to sustainable growth on an international level about environmental concerns convened in Founex, Switzerland, in 1971 was the first to discuss both the development and protection of the environment together side. The production and consumption patterns of industrialized nations, poverty, and underdevelopment are all cited in the report that was written up following the meeting as contributing factors to environmental issues. This outcome, which forms the basis of the sustainable development paradigm, led many poor nations to take part in the 1972 Stockholm "Human and Environment" conference (Erdem & Yanmaz & Ertem, & Karakaya, G. 2004).

The Brundtland Commission, formerly known as the World Commission on Environment and Development (WCED), first introduced the idea of sustainable development in 1987 as part of the document titled "Our Common Future." According to the paper, sustainable development is defined as "development that satisfies present needs while preserving the capacity of the next generation to satiate their own needs" (WCED, 1987, Soini, 2014). Urbanization, industrialization, population growth, depletion of natural resources, rise in environmental pollution, global warming, and the idea of sustainable development, which was created as a remedy for issues like species extinction. According to Brundtland report, it is demanding in order to "meet the needs of current, and the requirements of future generations", abandoning the capacity to meet their own is how it is defined as "Development that meets without giving" (WCED, 1987).

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).

The United Nations released the Rio Declaration in 1992. This declaration proclamation suggests balancing the three aspects of sustainability environmental, social, and economic, and defining trade-offs and priorities (Manzi & Lucas & Jones, T. & Allen Transportation Yenidünya, S. & Limoncu, 2020).

Social Sustainability

The preservation and enhancement of the welfare of the present and future generations can be generically referred to as social sustainability (Chiu, R., 2003). Environmental, economic, cultural, and social sustainability are the four main pillars of sustainability. Social sustainability is often a debated idea and open such as the general concept that sustainable development (Ghahramanpouri & Lamit & Sedaghatnia, 2013). The social pillar of sustainability, which was given more attention after the year 2000, is the one that has received the least amount of research among the social, economic, and environmental pillars (Doğu, F. & Aras, 2019, Dempsey & Bramley & Power & Brown, 2011).

Social sustainability is not absolute nor a constant, claim Nicola Dempsey and colleagues (2011). It must be thought of as a dynamic idea that will alter as time passes in a location (Eizenberg & Jabareen, 2017). According to Eizenberg and Jabareen, the goal of social sustainability is to promote the adaption of equal and just economic, social, and environmental policies in order to protect people against danger, regardless of race, ethnic origin, culture, or socioeconomic situation (Duman & Asilsoy, 2022, Vallance & Perkins, H & Dixon, J., 2011).

Many who use the term "social sustainability" reference the definition of sustainable development given in the Brundtland Report, Our Common Future: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (McKenzie, 2004).

The preservation and enhancement of the welfare of the present and future generations are major success elements for socially sustainable initiatives, according to Chan and Lee's assessment. A harmonic living environment, a reduction in social inequality and divisions, and an overall improvement in quality of life are all requirements for urban development to be considered socially sustainable. These key success criteria include the supply of social infrastructure, the availability of employment possibilities, accessibility, townscape design, conservation of regional features, and the capacity to meet psychological requirements. (Chan & Lee, G. 2008 Transportation Michael, Y & Peacock, C., 2011).

Experts constantly emphasize the need to define the recently recognized idea of social sustainability and are naturally interested in understanding social sustainability's exact definition (Williams, R., 2014).

Cultural Sustainability

Culture is made up of a society's beliefs, values, customs, and aspirations as well as the ways in which those values are articulated and practically implemented in day-to-day activities. It also includes the mechanisms and channels by which those values are preserved and passed on to future generations (Hawkes, 2001 Transportation Pop, I. & Borza & Buiga & Ighian & Toader, 2019).

Cultural sustainability stated that the most complex of the two or three challenging terms is culture. Because of the fact that culture has grown to be a crucial term in many different, frequently contradictory, systems of thought and intellectual disciplines (Soini, 2016, Pop, I. & Borza & Buiga & Ighian & Toader, 2019). As the idea of cultural sustainability took shape, researchers' attention turned to finding and examining the useful resources and strategies that may be utilized to protect, manage, and model culture in a way that achieves the broad goals of sustainable development (Bandarin & Van O., 2012). The Johannesburg Earth Summit in 2002 identified culture as the fourth aspect of sustainable development, and also the World Summit of Local and Regional Leaders in 2010 emphasized this. Despite this, cultural considerations have historically been underemphasized in sustainable development objectives (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, H., 2007).

According to Hawkes (2005), culture does in fact have a transformative effect on present development strategies, assisting in enlarging the scope of the present-day development discussion and increasing the relevance of development to the requirements of the general public. Hawkes continues by saying that sustainable development initiatives that are sensitive to the cultural context and unique characteristics of a place and community and promote a person-centered approach to development are most effective and likely to result in inclusive, sustainable, and equitable outcomes. Furthermore, an approach based on human rights that respect cultural diversity can promote intercultural understanding, avert conflicts, and defend the liberties of marginalized groups both within and across national boundaries, fostering the ideal environment for the achievement of development objectives. This understanding of culture increases the sustainability of development (Hawkes, 2005 Transportation Naibei, 2014).

Environmental Sustainability

This process of growing ecological consciousness has also resulted in the development of mechanisms that will support the idea of sustainability. The three key ideas serve as the foundation for all suggested mechanisms. To summed up as

the realization that ecological environments require the broadest participation and consensus because conservation depends on socialization, the notion of security, direct participation, and democracies. This is a growing realization that protection of the environment, and pollution prevention, with the concept of "sustainable development" can be accomplished only through "decentralized" solutions (Akgül, 2010).

The phrase "environmental" is virtually typically used in connection with how people interact with ecosystems. In order to increase certain, it appears appropriate to see "environmental" as a component of the more general concept of "ecological," that is, the meeting point of human endeavours and ecological processes (Jeronen, 2020). Once they could create and preserve it without harming the surrounding environment or natural resources, humanistic acts aid in the continuity of the ecological environment. A sustainable environment is one that leaves the world in a better or more efficient state than it is now in order to benefit future generations. So that they do not harm the environment or contribute to energy consumption, recycled materials should be entirely recyclable or renewable, at the end, utilized energy should be completely renewable and should not contribute to pollution (Boström, M., 2012). Therefore, environmental sustainability might be explained more precisely as a state of equilibrium, adaptability, and interconnectedness that permits human society to meet its needs without going over the capacity of the ecosystems that support it to keep on regenerating the services required to do so (Jeronen, 2020).

Environmental sustainability has become increasingly popular in popularity (Moldan & Janoušková, & Hák, 2012). For instance, P. Sutton, Commissioner for Environmental Sustainability for the Australian State of Victoria, described environmental sustainability as the capacity to preserve the attributes that are regarded as valuable in the physical environment (Sutton, 2004 Transportation Moldan & Janoušková, & Hák, 2012). 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 method by which people produce social and environmental consequences, economic sustainability refers to the way in which economic systems foster sustainable environmental and social results. The sustainability of the economy, one of the sustainability pillars, is essential to sustaining human, environmental, and social resources required for income and living standards (Basiago, A., 1998). The sustainability that 'economic sustainability' aims towards is the sustainability of the system of the economy itself. The concept of economic sustainability has been first used by Hicks (Berardi, 2015). Bernardi, et al. stated that economic sustainability addresses the actual economic effect that exists on its economic environment (Bernardi & Carlucci & Cornaro & Bohne, 2017, Ozay, N., 2005).

The equilibrium between environmental advantages and economic costs is economic sustainability. In this condition of equilibrium, it includes things like conserving renewable resources, utilizing non-renewables sparingly, and switching to renewable resources while maintaining economic activity (Duran, 2018).

Researchers contend that the developing discipline of sustainability economics could be characterized by four key characteristics by interpreting the current economic contributions in light of the general concept of sustainability (Baumgärtner & Quaas, 2010). These are;

1. Subject focus on the relationship between humans and nature.
2. Orientation towards the long-term and inherently uncertain future.
3. Normative foundation in the idea of justice, between humans of present and future generations as well as between humans and nature.
4. Concern for economic efficiency, understood as non-wastefulness, in the allocation of natural goods and services as well as their human-made substitutes and complements.

Sustainability in Architecture

The terms "sustainable" and "sustainability" started to become important topics in the discussion of architecture at the finish of the 20th century. In response to a wide range of current concerns regarding the effects of human activities,

sustainable architecture is a redesigned conceptualing of architecture (Williamson, T. & Radford & Bennetts 2003).

Sustainability is a concept that is debated in both the architecture and science disciplines today. Sustainable architecture takes into consideration a number of factors, including minimizing environmental harm, protecting biological diversity, utilizing clean, renewable resources, utilizing locally produced recyclable materials, preserving and revitalizing historic sites, and taking into account the economic and cultural concerns of each society (Pourdehqan & Rashidi & Saeed F. & Najafi, 2015, Boström, 2012). Utilizing regional and local resources, sustainable architecture is designed and built with an eye toward the environment (Boström, 2012).

The term "sustainability" in architecture refers to future-focused design and development. Architecture that is sustainable combines human and technological goals. The International Council on Building (CIB) established the goal of sustainable architecture as building and innovating a synthetically healthy environment founded on ecological design with resource efficiency in 1994. A structure that is sustainable is one that can best adapt to its surrounding natural and manmade environments. This includes the building itself as well as the local, national, and international environments (Mofidi S. &Akhtar K. & Akhtar K., 2008, Soflayi 2006 Transportation Zabihi & Habib, 2012).

According to Owen and Dovey, in order to develop sustainable design, "both sustainability with architecture as social practice" must be positioned (Owen & Dovey, 2008 Transportation Elkady & Goubran, 2022). Guy and Framer argue that a social constructivist point of view should be adopted in place of the positivist tenets that support sustainable design practice and research (Guy & Farmer 2001). Despite the fact that modernism appeared before sustainability as we know it today, both ideas share a fundamental ethos (Elkady & Goubran, 2022).

The providing its occupants with secure and comfortable living spaces, sustainable architecture is defined as a design for buildings that preserves the environment by using natural resources as little as possible. In this situation, the aspect of sustainable development that should be taken into account is architecture.

By designing and developing sustainable structures, adhering to sustainability principles at each phase of construction, with continuing the procedure at the end of usage, architecture will be able to contribute to sustainable development (Canan, 2003). In order to be sustainable, architecture must include ecology at all stages of design and construction. This includes using resources that are renewable, energy-efficient technologies, materials that are environmentally friendly, recycling, and reuse activities (Üstün, 2008).

The ability to connect the life cycles of ecological systems in the biosphere with building systems is a hallmark of sustainable architectural design. From their source to the smallest piece of equipment inside the building, construction materials and energy sources must coexist peacefully with ecological systems with the least possible environmental impact. A successful ecological structure should have as little negative impact as possible while having as much beneficial influence as possible (Yeang & Richards, 2007). One of the most crucial aspects of a sustainable structure is resource consumption since it guarantees the reduction of hazardous waste and environmental harm. Non-renewable energy use in buildings and the efficient use of sustainable energy resources are related (Demirel E., 2013).

The main objective of sustainable architecture is to balance development, social equity, ecology, and economy while still providing for human needs. Today, methods known as ecological, bioclimatic, and energy-efficient design or architecture which essentially serve the same functions and concentrate on particular subjects are widely used, especially in accordance with the individual approaches of designers and users (Sakınç, 2006).

With rising energy prices, resource scarcity, and the focus placed on human health, sustainability is becoming increasingly crucial in the building industry. Considering the historical process, governments around the world, research organizations, and many sectors within the national building sectors strive continuously to assure sustainable growth. Sustainable architectural products should have the following characteristics, according to Bourdeau (1999):

- It offers the best level of comfort and health for people.
- It aims to improve people's quality of life.

- Effectively and efficiently uses resources.
- It maintains biodiversity.
- Production of waste is minimal and under control.
- It is extremely durable and built to the highest standards.
- It makes use of recycled and reusable materials (Bourdeau, 1999, Transportation Demirel E., 2013).

The history of the sustainable development discourse is entwined with notions of utopia, nearly in keeping with modernist philosophers and architects (Harlow & Golub & Allenby, 2013). Modernism and sustainability don't have to go together; in fact, they are very compatible in many ways (Vellinga, 2013).

The improvement of people's lives by the built environment, encompassing the environmental with ecological scope now recognized through sustainability, can therefore be deduced to be an integral aspect of modernism that is cognitively concerned with sustainability (Elkady & Goubran, 2022).

CHAPTER III
Methodology

In this part of the thesis, the methods and materials of the research are mentioned and the conceptual framework of the study is revealed. In the next stage, the data collection method was explained and the housing structures in different countries were examined in order to reveal the architectural criteria, approaches and sustainability context of the modern period. Then, the modern period North Cyprus was examined in the context of the city of Nicosia and how it developed was explained. First of all, the North Nicosia and Kumsal region, which was chosen as the study area, was introduced. In the next step, the design of the study, examples, data collection method and the plan of the study are explained. In the selected row houses, theoretical approaches in the context of modern architectural approaches and sustainability parameters were used 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.

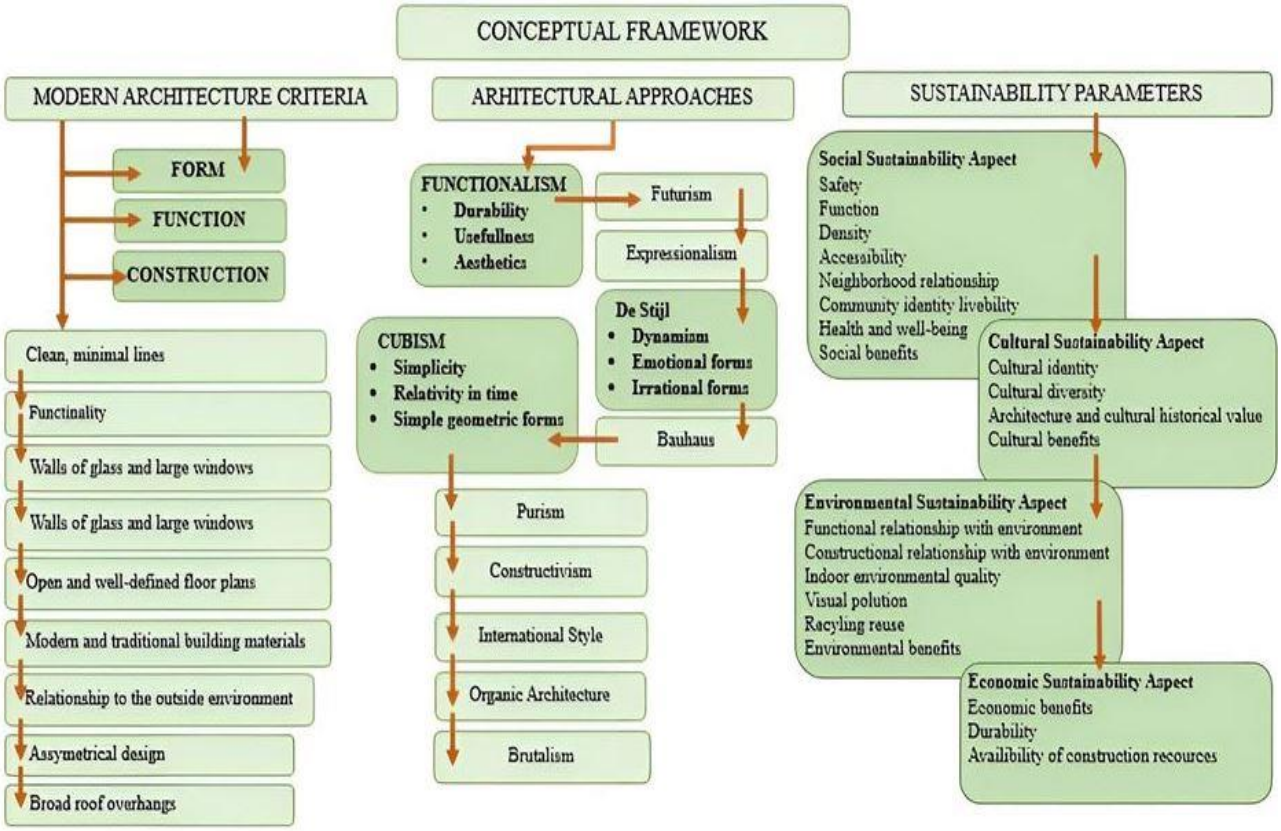
Conceptual Framework

In this thesis, the term modern and related terms are introduced, and in this context, the modern period and the modern architectural period are examined in detail. The concepts of form, function, and construction, which are the main concepts of the discipline of architecture, are discussed with the criteria of modern architecture. Architectural approaches that emerged as a result of the modern architectural period are explained one by one with their features, criteria, and representative examples, adhering to the chronological order. Then, the literature review on the concept of sustainability, social, cultural, environmental, and economic sustainability, and sustainable architecture, which are the parameters of sustainability, are discussed with a theoretical framework. It can be clearly said that the architectural criteria determined by the modern period are applied in many period buildings. In addition, it has been seen that the approaches of the modern period have applied different building types in the context of these criteria, taking into account their own styles in their designs.

The concept of sustainability, which is a wide scope, is defined with its parameters, and its parameters are explained by supporting it with spot words. Within the scope of this extensive literature review, the theoretical framework of the thesis has been revealed in order to determine the relationship between modern architectural criteria and approaches and sustainability. The conceptual framework of the thesis is presented in Figure 8.

Figure 8

Conceptual Framework of the thesis, (Author, 2023).



Data Analysis Procedures

The residential buildings designed in the modern period and Efruz rowhouses, which have distinctive features of the modern period, were examined in light of the information gathered in the framework indicated in Table 14. The data were collected with an observation method for the selected field study, similar samples analysed, and three approaches to evaluating the chosen field: theoretical, analysis/practical approaches and observations. First, the evaluation of the analysed area was done on an evaluation table. The table has been created by considering two main headings and their subheadings. The evaluation consists of a total of five tables based on the

creation of a general table for row houses consisting of a total of thirty-one houses, and the measurement of the architectural criteria and function of four houses that change function among thirty-one houses. The result of this will be created with the current status of Efruz Row Houses (Müdüroğlu Houses) located in the Kumsal region, obtained from the analysis of the evaluation in the context of modern architectural criteria, approaches, and sustainability parameters.

Table 14

Information card for the analysis of Modern houses, (Author, 2023).

<table>
<tr><td colspan="3">Evaluation of Modern Buildings Within The Sustainability Parameters and Modern Architectural Criteria</td></tr>
<tr><td>Evaluated Building</td><td>Sustainability Parameters</td><td>Evaluation</td></tr>
<tr><td>Neighborhood Name: --
Type of Efruz Houses: --</td><td>Street Name: ---</td><td></td></tr>
<tr><td rowspan="4">Efruz Houses (Müdüroğlu Houses) Year: -

Maps and facade photos of the house</td><td>Social Sustainability</td><td>The evaluation in terms of ‘Social sustainability’
Safety,
Functionality,
Density,
Accessibility,
Neighborhood relationship
Community identity livebility,
Health and well-being,
Social benefits</td></tr>
<tr><td>Cultural Sustainability</td><td>The evaluation in terms of ‘Cultural sustainability’
Architectural and Cultural identity,
Cultural diversity,
Architecture and cultral historical value,
Cultural benefits</td></tr>
<tr><td>Environmental Sustainability</td><td>The evaluation in terms of ‘Environmental sustainability’
Functional relationship with environment,
Constructional relationship, with environment,
Indoor-outdoor environmental quality,
Visual polution,
Recyling reuse,
Environmental benefits</td></tr>
<tr><td>Economical Sustainability</td><td>The evaluation in terms of ‘Economical sustainability’
Economic benefits,
Durability,
Availability of construction resources</td></tr>
</table>

Table 14 (Continued)

Architectural Space Criteria	Evaluation (Architectural Criteria)	
Form	Spaces Analysis	
Ground and first floor photoes	*Names of ground floor spaces*	*Interior space photo*
	Names of first floor spaces	*Interior space photo*
Front and back elevation photoes	*The evaluation of the form analysis*	
Function Original Function:-- Today Function: --	*The evaluation of the function*	
Construction Sturucture/ Material: --	*The evaluation of the construction*	

Related Research

Examining the Modern Period in the Context of Architectural Approach and Sustainability According to the Related Research

The 20th century has been a period in which new theories and concepts emerged in the field of architecture, innovative examples were presented in architectural discourse and practices, and architectural designs began to be simplified. At the same time, developing technology, science, philosophy, art, and economy around the world have been influential in the change of societies and the emergence of new thoughts and ideas.

Different design approaches, which started with the industrial period and emerged with the modern architectural period, caused the architectural criteria to develop and change. According to these changes have also started in architectural spaces. With the emerging architectural approaches, these changes show themselves in the spaces. With the modern architectural period, the design fiction of the buildings and the relationship between interior and exterior began to be considered as a whole. In this context, many modern period architects responded to these criteria and approaches in the buildings they designed in this period. In order to achieve the purpose of the study, nine modern period houses related to the scope of the study area were selected and these houses were evaluated in the context of modern period criteria and approaches and sustainability parameters. The sample houses selected in

relation to the subject will be analysed with a systematic approach. These; will be evaluated in terms of form, function, and material in terms of architectural criteria, and social, cultural, environmental, and economic in terms of sustainability.

Examining the different examples related to the subject will strengthen the study. In this context, it will clarify the relationship between this type of modern period houses and the criteria and sustainability parameters of the period. At the same time, it will create a foreword on how the criteria and approaches of houses will be evaluated with sustainability parameters for the selected study area.

Example 1. Modern Architectural Approaches and Sustainability for Casa Mila (1906-1912)

The most remarkable structure with curvilinear shapes is Casa Mila, which was created by Antoni Gaudi in the city of Barcelona, Spain Gaudi designed Casa Mila combined with naturalistic elements. Gaudi took inspiration from the undulating shapes of the Montserrat mountain group and Cole Laura Hill near Barcelona since Gaudi once wrote about art philosophy in his notebook when he was a young boy. Its free open plane easily spreads around a courtyard in ups and downs and coherent flow, organic bent or leaning in various degrees in each partition of various routes, continuous curling wall, and the ground in an organic whole. By combining colourful mosaic materials like broken glass ceramics and terra-cotta tile shards, the curve produced a light sensation and decorous feeling. The entire structure, which resembles soft sculpture from the outside, is a typical example of a representative piece in art that accurately executes organic curves (Liu, 2017).

The structure, an outstanding work combining Art Nouveau and Expressionism, was constructed as a substantial apartment complex on a corner lot on Barcelona's main thoroughfare, Gracia (Gropius 2002 Transportation Benian, 2010).

The building, which is an example of Art Nouveau and Expressionism, was built as a large apartment building located on a corner plot on Gracia, one of the important streets of Barcelona. Access to the area by foot and vehicle is quite easy. It also contributes to the region socially and economically. Because of all these features, it is an important structure in terms of sustainability. The building, which reflects the modern architectural approaches it carries very well, still maintains its

sustainability. It has criteria such as density, neighbourhood relations, walkability, transportation by vehicles, which are among the parameters of social sustainability.

Designed with the modern materials of the period, Casa Mila, when evaluated in the context of cultural sustainability, reflects the architectural identity of the period with its construction, architectural approaches and technique. Since the modern construction materials used in the construction of Casa Mila are durable and environmentally friendly materials, they have still been maintained until today without deterioration. Designed and built in the modern period, Casa Mila was designed as an apartment and is still visited by the public as a cultural center since it has cultural heritage value. The structure, which has social and cultural values, maintains its economic sustainability today. The building, located in the tourist center, increases the commercial, residential, and land real estate values. Thus, while its environmental sustainability continues, its economic sustainability also continues. See Table 15.

Table 15

Modern Architectural Approaches and Sustainability for Casa Mila (1906-1912), (Author, 2023).

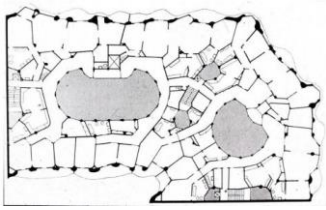
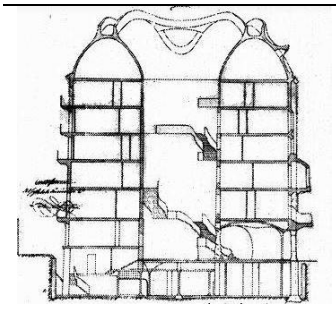
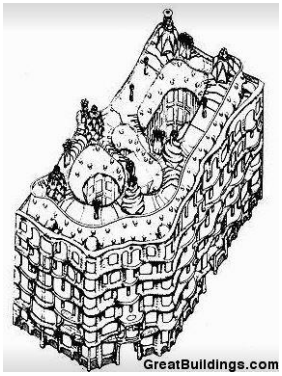
Barcelona/ Spain - 1906-1912 - Antoni Gaudi House		
 Plan (Molloy, C., 2023)	 Entrance Facade (Molloy, C., 2023)	  Interior Spaces (Brannigan, M., 2022)
 Section (Molloy, C., 2023)	Form analysis	The plan design consists of curvilinear forms. It has the characteristics of the Functionalism, Art Nouveau, Organic and Expressionism approaches. The curvilinear forms on the exterior continued in the interior, created a strong relationship between interior and exterior.
	Function	Designed as a large apartment building, Casa Mila was listed as a World Heritage Site by UNESCO in 1984. In 1996, it was restored and visited by the public as a cultural center.
	Construction	The load-bearing walls on the façade serve as curtain walls. Stone blocks connected to the structure by metal components form large window openings. Three different stones were used on their facades. In the interior, stained glass windows and amorphous cast iron balustrades attract attention.
		Sustainability Parameters

Table 15 (Continued)

 Axonometric drawing (Molloy, C., 2023)	Social Sustainability	Social sustainability parameters include density, neighborhood relationship, walkability, and vehicle accessibility at Casa Mila.
	Cultural Sustainability	In the context of cultural sustainability, Casa Mila is a very important historical cultural value that determines the architectural identity of the city of Barcelona in terms of construction technique, construction style, and building form.
	Environmental Sustainability	Casa Mila was built in an environmentally friendly way. The building materials used in this house maintain their environmental sustainability as they are built as environmentally friendly building materials.
	Economical Sustainability	Still maintaining economic sustainability, Casa Mila raises the values of the surrounding land and commercial and residential real estate. For this reason, it has also created a tourist attraction center. It still contributes to economic sustainability as it preserves its environmental, cultural, and social sustainability.

Example 2. Modern Architectural Approaches and Sustainability for Steiner House (1910)

Adolf Loos has become a well-known architect for his simple, compact constructions. The Steiner House, which he constructed in the city of Vienna for the couple of Hugo and Lilly Steiner, is among the best illustrations of the care that he took to avoid decorations in his designs (Prina, F. & Demartini 2006). The Steiner House, which is regarded as one of the most iconic structures of European modernism, was constructed in Vienna, a city with strict planning regulations (Irving, & St John, 2007). Adolf Loos, a critic of the modernist movement, is regarded as one of the forerunners of modern thought thanks to the idea of the free plan. due to the Steiner House being the first building that sparked the growth of the ideas of freedom and the plan of multitudes. Because of his belief in the free plan, Adolf Loos, a modernist movement opponent, is considered one of the founders of modern thought. because the Steiner House was the first structure to foster the spread of the principles of liberty and the plan of numerous items. Adolf Loos' theories are reflected in the House's architecture. It is built on a hill with a plain surface and big windows, and its roof is made of a combination of wood, concrete, and curved metal. The structure is an unadorned, symmetrical bulk, and both its front and back facades lack ornamentation. The house is displayed as an illustration of the International Style in 1930s architecture as a very simple concrete building with a smooth, basic, and simple facade with sharp rectangular lines (Khan, H. 1998, Frampton, 2007).

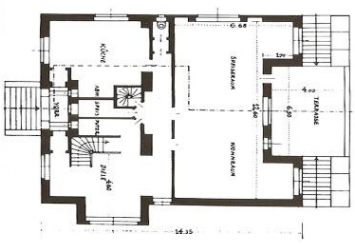
The Steiner House, with its refusal of ornamentation on the facades, its windows that are simply constructed and arranged with exact lines, and its cubic shape, is the first modern structure to be designed in Vienna in the entire history of twentieth-century architecture. Three main floors, plus a basement floor make up the structure. Loos created a mansard roof and opened a rooftop window on the house's street-facing facade. He also curled the roofing to the ground (Vergo, 1981 Transportation Benian, 2010). The basement floor's roof was elevated using the whole width of the home to create a terrace on the back facade that looks out onto the garden and is directly accessible from both the primary living with dining areas. The Steiner House's interiors have a more luxurious appearance thanks to the extensive use of wood for the doors, windowsills, cladding, and ceiling grids. By not resembling numerous designs from that era, this design technique has produced a unique piece. (Moffett & Fazio, M. & Wodehouse, 2003).

Steiner House was built in Vienna. To the region where the house is located both on foot and by car, access is simple. Additionally, it has a positive social and economic impact on the area. The design is a valuable building in the context of sustainability because of all of these features. The structure still reflects the modern architectural approaches it has quite well, and it is protected sustainability. It has elements for social sustainability like density, neighbourhood relationships, walkability, and vehicle transportation. When examined in terms of cultural sustainability, Steiner House's design, use of modern materials, and architectural technique all reflect the time period's distinctive architectural identity. Due to the strength and environmental friendliness of the modern materials used for the construction of Steiner House, they have been preserved up to this day without degrading. Steiner House, which was designed and built in the modern period, was designed as a house. Today, it still preserves its cultural value as a house and is visited by tourists. The building, which upholds the values of society and culture, continues to be economically sustainable today. The building's location in a tourist, friendly city raises the value of the surrounding, land property, residential, and commercial. Thus, it continues to be economically sustainable while maintaining its environmental sustainability. See Table 16.

Table 16

Modern Architectural Approaches and Sustainability for Steiner House (1910), (Author, 2023).

Austria/Vienna - 1910 - Adolf Loos House

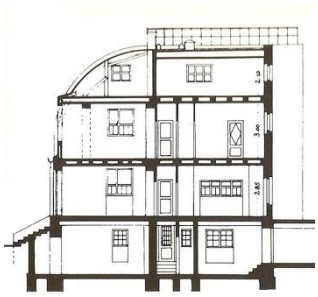


Plan
(Architectuul, 2023)

Entrance Facade
(Architectuul, 2023)

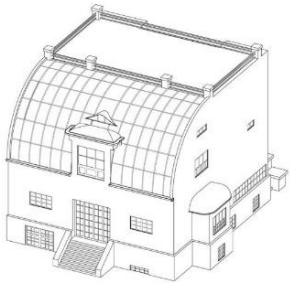
Interior Spaces
(Architectuul, 2023)

Table 16 (continued)



Section
(Architectuul, 2023)

Form analysis	Steiner House has been simplified in the form of a mass and designed symmetrically and simply with the free plan technique. It is in the form of a simple and white cube away from ornaments. The interior spaces are designed as open, flowing into each other. Being one of the prototypes of early modernism, Steiner House carries the approaches of rationalism, functionalism, purism, cubism and international style.
Function	Steiner House, which was designed as a house, is now a residence and opened to tourists.
Construction	The house is designed from concrete and wood materials. The roof is made of sheet metal and the walls are made of concrete and brick.
	Sustainability Parameters
Social Sustainability	Steiner House has criteria such as social sustainability parameters, accessibility, transportation, walkability, and by vehicle.
Cultural Sustainability	Steiner House is a crucial historical-cultural value in the perspective of cultural sustainability since it shapes Vienna's architectural character in terms of construction method, construction style, and structural form.
Environmental Sustainability	The Steiner House was constructed with the environment in mind. Given that they were created as ecologically friendly building materials, the materials utilized to construct this house preserve their environmental sustainability.
Economical Sustainability	Steiner House increases the value of the nearby land and of residential and business properties while yet ensuring economic sustainability. While maintaining its social, cultural, and environmental sustainability, it continues to contribute to economic sustainability.



Axonometric drawing
(Architectuul, 2023)

Example 3. Modern Architectural Approaches and Sustainability for Schröder House (1923)

The Schröder House, which Gerrit Rietveld built in Utrecht in Netherlands in 1923, is regarded as the De Stijl approach's most iconic building, and its outside has been compared to Piet Mondrian's artwork (Kortan, 2000). The vertical and horizontal harmony of the materials, colours, with geometric forms, provides the house's harmony, which is based on the disintegration concept of a cube. The De Stijl approach's architectural philosophy is based on the idea that a building and a free plan system should first be divided into its areas, and to carry these spaces should be reassembled in an arbitrary order (Gürer, T., 1995). The front side of the balcony faces the southeast facade, and the glass-only roof hung over the east corner gives the appearance that it is floating in space. A 90-degree angle connects the windows which open outward to the façade, which is bordered by trees of various colours (Leuthäuser, 2001).

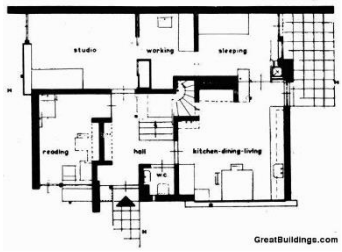
The Schröder House, which had been designed to be a private house, was later placed under UNESCO's protection. According to the 1988 Monuments and Historic Buildings Act, the Rietveld Schröder house is recognized as a national heritage monument. The adjacent region is designated as a green space. In cooperation with the Rietveld Schröder Home Foundation, the Central Museum, and the city Museum of Utrecht, manages and maintains the house (van Thoor, M. 2019). The house is formed up of both horizontal and vertical planes that are painted white or grey, rather than just made up of walls and a roof. Contrary to popular belief, the walls are composed of plastered brick rather than concrete. Some balconies have projecting walls composed of reinforced concrete (Leuthäuser, 2001). Similarly radical and Mondrian-like is the use of colour. All linear components are painted in strong hues like red, blue, and yellow, with surfaces being either white or grey (Curtis, W. J. & Curtis, W., 1996, Leuthäuser, 2001 Transportation Benian, 2010). The Schröder House is defined as a "whole of art" that combines the visual arts with the built environment (Curtis, W. J. & Curtis, W., 1996).

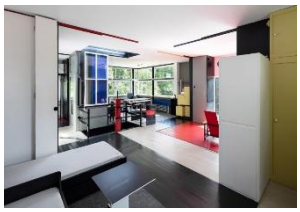
Schröder House was built in Utrecht. It is easy to reach the location of the house by car and on foot. It makes a social and economic contribution to its location. Because of these features, design is a valuable structure in terms of social

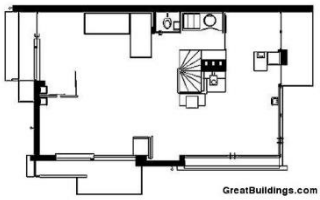
sustainability. The building still carries the criteria of modern architecture and continues to function as every house. It has social sustainability criteria such as neighbourhood relations, density, vehicle access, and walkability. Schröder House supports the architectural character of the region in terms of construction method, construction style, and structural form. It is a very important historical-cultural value in terms of cultural sustainability. It is also protected by UNESCO as a cultural heritage. The environment was taken into consideration when building the Schröder House. The materials used to build this home maintain their environmental sustainability because it was designed as environmentally friendly building materials. The Schröder House maintains economic sustainability. It increases the value of land, residential and commercial properties in the surrounding area. While maintaining its social, cultural, and environmental sustainability, it continues to contribute to economic sustainability as it is listed as a cultural heritage and is visited by tourists as a museum. See Table 17.

Table 17

Modern Architectural Approaches and Sustainability for Schröder House (1923), (Author, 2023).

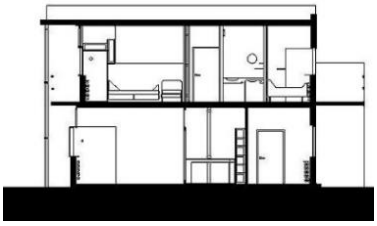
<table>
<tr><th colspan="3">Uthrect/ Netherlands - 1923 - Gerrit Rietveld House</th></tr>
<tr><td> 

Ground Floor Plan
(Great Buildings, 2021)</td><td colspan="2"> 
Entrance Facade
(UNESCO, 2010)</td><td> 

Interior Spaces
(Block, 2018)</td></tr>
<tr><td rowspan="3"> 

First Floor Plan
(Great Buildings, 2021)</td><td>Form analysis</td><td>The Schröder House, which carries all the principles of the De Stijl approach, is based on the principle of first dividing into spaces with the free plan technique, and then reuniting these spaces in an unordered manner. The house contains the plastic building elements of modern architecture such as mass, function, surface, time and space, light, color and material. The house, which is designed on the fragmentation of the cube, is provided by the horizontal and vertical harmony of materials, colors and geometric forms.</td></tr>
<tr><td>Function</td><td>Schröder, which was originally designed as a house, was now opened to tourists as a museum in Utrecht after being restored.</td></tr>
<tr><td>Construction</td><td>The walls are made of plastered brick. Large windows are designed on the facades.</td></tr>
</table>

Table 17 (Continued)

		Sustainability Parameters
 Section (Great Buildings, 2021)	Social Sustainability	The Schröder House meets requirements for social sustainability, accessibility, transportation, walkability, and by car.
	Cultural Sustainability	Schröder House shapes the architectural character of Uthrecht in terms of construction method, construction style, and structural form. It is a very important historical-cultural value in terms of cultural sustainability.
	Environmental Sustainability	The environment was taken into consideration when building the Schröder House. The materials used to build this home maintain their environmental sustainability because it was designed as environmentally friendly building materials.
	Economical Sustainability	The Schröder House maintains economic sustainability. It increases the value of land, residential and commercial properties in the surrounding area.

Example 4. Modern Architectural Approaches and Sustainability for Villa Savoye (1928)

The Villa Savoye was a masterwork of Le Corbusier's purest architecture and one of the most well-known homes of the modern movement. It is possibly the best illustration of Le Corbusier's intention to design a home that would function as a "machine a habiter," meaning machine for dwelling (in). The house, built in 1929, is as lovely and practical as a machine and is situated in a district close to Paris. The main forms of pyramids, cubes, cones, cylinders, or spheres, according to Le Corbusier, are more distinct and beautiful. The form of the villa Savoye is a box hoisted up by Piloti. Villa Savoye is dominated by the cube's geometric simplicity. A surface of architecture displays the building's fundamental geometric shape without a variety of styles adorning it (Mehmeti, 2014). With a ramp, widespread usage, the fundamental idea, a design that integrates into nature, and a sufficient space analysis demonstrate utilization in line with the function plan. Located atop its thin columns, Villa Savoye resembles a box that has been elevated above the ground. Le Corbusier demonstrated how a building may be carried over the columns not supporting any walls (Courland, 2011 Transportation Özsavaş U., 2020). Villa Savoye is described by Le Corbusier as "*the house is a box above the ground, perforated all around, without interruption, by a long horizontal window*." The facade commands notice because of its regular geometric proportions (Le Corbusier, A. & Schreiber, 1991 Transportation Özsavaş U., 2020). The circular walls give the villa shape movement.

A ramp leads down to the garage, which is at the bottom of the structure. From the entryway to the terrace floor, all floors are transported using this ramp (Özsavaş, U., 2020).

Villa Savoye's floor design resembles a square, though not exactly. The structure rises over the pilots and separates from the earth. It is divided into three sections: the main floor, the second floor, which serves as the primary living area, and a rooftop garden. Each floor's layout is organized to meet functional needs (Benian, 2010).

Le Corbusier says that it is necessary to create a spatial abstraction using the characteristics of materials and technological advancements in modern architecture and that interior and external spaces should be planned in concert from a holistic standpoint. With this in mind, Villa Savoye designed its interior (Özcan & Ürük, Z. 2019). After Villa Savoye was sold to the Poissy municipality in the late 1950s, an "international preservation campaign" was launched to protect Le Corbusier's structures. Le Corbusier started taking care of the House's future in April 1960 when he sent a request to UNESCO, but the restoration didn't start until 1962 since the House was being utilized as one of Minister Herzog's youth centers, the Maison de Jeunes de Poissy. The first significant restoration of the home, carried out by Jean Dubuisson, could be seen as the start of a long journey toward the conversion of the structure into a museum (Gherardini, S. & Olmo, 2015). The Villa Savoye is devoid of ornamentation and possesses characteristics like simplicity and purity. The house's geometric form-based design exhibits a rational, formalist, and deductive style of architecture (Kortan, 1986). The ground floor of the reinforced concrete building is painted green, while the higher levels are painted white.

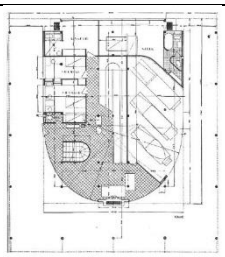
Villa Savoye, located in the town of Poissy, a little outside of Paris, has parameters of social sustainability such as accessibility, transportation, transportation by car, walkability. The architectural identity of the region is shaped by the House's construction style, method, and building form. It has significant historic cultural value for preserving cultural diversity. Villa Savoye is surrounded by a sizable green space and is situated farther from the road than it is from the natural world. Le Corbusier stated that the vegetation and soil rank among the most attractive aspects

of nature and that his building will be placed with as little contact with the ground as possible (Özcan& Ürük, Z. 2019). Hence the House was designed by considering the environment during the construction phases. Since the materials used in the construction phase are environmentally friendly materials, still its environmental sustainability. While raising the amount of the nearby real estate, both residential and commercial, Villa Savoye also preserves its economic viability. The house, which has gained value as a museum today, also contributes to the economy of its surroundings by the visitors. See Table 18.

Table 18

Modern Architectural Approaches and Sustainability for Villa Savoye (1928), (Author, 2023).

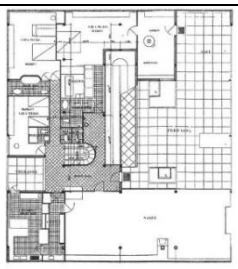
Poissy, France - 1928 - Le Corbusier House

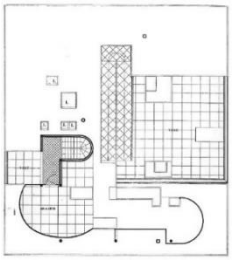


Ground Floor Plan
(Leiva, 2023)

Entrance Facade
(Kroll, 2023)

Interior Spaces
(Kroll, 2023)

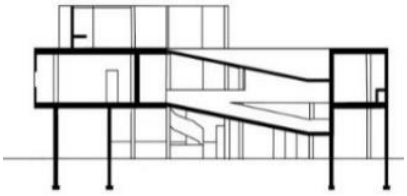




First and Second Floor Plan
(Leiva, 2023)

Form analysis	The plan is independent of the building structure. The free plan technique was applied with a flat roof. The ground is combined with the pilotis. Villa Savoye, the most obvious representation of the Purism approach, has features such as pilotis, free plan, free facade, roof garden, and circle in which long vehicles turn. The same large window system was designed in spaces with different functions.
Function	Designed as a house, Villa Savoye later became the property of the French state. It was designated a French historical monument. After it was restored in the following years, it was taken under the auspices of the Center des Monuments National and accepted visitors.
Construction	In the structure designed from reinforced concrete, the ground floor is painted green and the other floors are painted white. The roof is designed as a terrace. The walls are not designed as a load-bearing element but for aesthetic and functional concerns. By separating the facade from the load-bearing elements, design freedom is provided on the facades.

Table 18 (Continued)

		Sustainability Parameters
 Section (Leiva, 2023)	Social Sustainability	Villa Savoye includes parameters such as transportation, walkability, accessibility, and transportation by car, which are the parameters of social sustainability.
	Cultural Sustainability	The House construction style, construction method, and building form shape the architectural character of the region where it is located. It has a valuable historical cultural value for cultural sustainability.
	Environmental Sustainability	The House was designed by considering the environment during the construction phases. Since the materials used in the construction phase are environmentally friendly materials, still its environmental sustainability.
	Economical Sustainability	Villa Savoye maintains its economic sustainability while increasing the value of the surrounding land, commercial and residential properties.

Example 5. Modern Architectural Approaches and Sustainability for Fallingwater House (1935)

Wright created The Fallingwater House, a getaway home in Pennsylvania from 1935 and 1939, for Edgar J. Kaufman on a property containing a waterfall. Wright brilliantly reflected organic architectural approach in the construction of this home by placing it atop a flat piece of rocks above the water that was seeping out from beneath it. The House rests on the horizontal axis of the building and is centered on four stone columns. Similar to tables that have been overlay, these planes stretch in all directions. It terminates with a protruding smooth concrete patio. When the dwelling is accessed through a path, its existence is noticed. The house's tight connection to the outside is a notable aspect of the design. The arrangement of the rocks, plants, and water has been planned to look like it belongs inside the house (Prina & Demartini, 2006, Doordan, D. 2001). The Fallingwater House, in Wright's opinion, perfectly exemplifies the concepts of organic design. On the other hand, Wright defined organic architecture as the home growing naturally from the inside out in balance with its own existence (Benian, 2010).

The house's structure lacks curved edges, horizontal eaves, and a hipped roof. On the horizontal plane, white prisms and natural stones intersect the structure. The structure has a system of intersecting horizontally and vertically placed prisms. Wright used geometric shapes and right angles when designing a building, but he

also took the waterfall into account. The structure stands out by generating contrast in the surrounding landscape thanks to the horizontal white bands on its façades. Together, the waterfall with the surroundings becomes a whole (Kortan, 1996c).

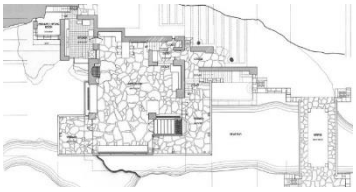
Wright used the 'breaking the box' and De Stijl design philosophies in the creation of this home. Theo van Doedburgh stated in 1924 that he did not attempt to lock different functions in an enclosed cube, instead designing them into planes that project outward. The building is given dynamism by it, as though the functional rooms were being thrown out from the building's center. (Kortan, 1986). Every aspect of this design, from the material selection to the room layout and even the creation of the plan drawings, demonstrates the idea of "breaking up the box" of the house. It has to do with how geometric shapes are arranged both horizontally and vertically in a certain system. These entities seem to have been hurled in various directions after being fragmented by an inner force and its result (Yırtıcı, 1996).

By utilizing earth, fire, air, and water the essential components of life earth and plant science served as the inspiration for designing the Frank Lloyd Wright Fallingwater House. The structure, which was created by combining stone and concrete, has an antique and modern appearance (Doordan, D., 2001). Located in Ohiopyle, Pennsylvania, Fallingwater House embodies the parameters of social sustainability. It includes parameters such as easy access, walkability, transportation by vehicle, and accessibility. Fallingwater House shapes the architectural identity of Ohiopyle, Pennsylvania. Both its construction technique and building form and its harmony with its environment ensure its cultural sustainability. The building, which has historical cultural value, was included in the World Heritage List by UNESCO in 2019. During the construction of the house, the design was carried out without ignoring its surroundings. It is in close contact with the surrounding land. Environmentally friendly materials were used in the construction of the house. Thus, its compatibility with the environment is also ensured in terms of materials. The house maintains its environmental sustainability, as environmentally friendly materials are used in its construction. The house, which is used as a museum, contributes to economic sustainability by gaining even more value thanks to the visitors. In addition, the house also adds real estate value as residential and commercial to the region where it is located. See Table 19.

Table 19

Modern Architectural Approaches and Sustainability for Fallingwater House (1935-39), (Author, 2023)

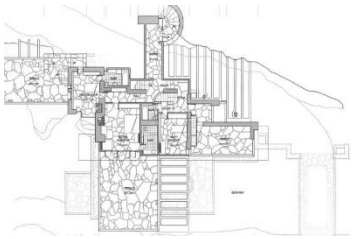
Ohiopyle, Pennsylvania - 1935-39 - Frank Lloyd Wright House

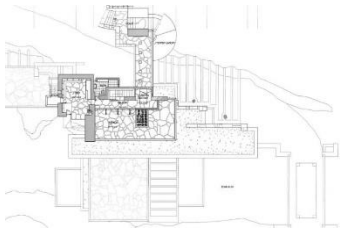


Ground Floor Plan
Ruschak, P., 2023

Entrance Facade
(Creager, 2023)

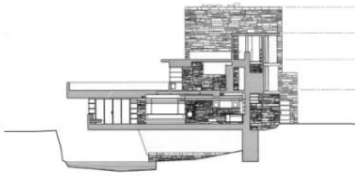
Interior Spaces
(Perez, 2023)





First and Second Floor Plan
(Ruschak, P., 2023)

Form analysis	The Fallingwater House has a horizontal plan plane. It skillfully reflects the organic architectural style, which is one of the movements of the modern period. In addition, the principle of fragmentation of the box, which is one of the principles of De Stijl, is also seen in the house. Indoor and outdoor are intertwined. The structure includes a set of prism systems and a system that intersects horizontally and vertically.
Function	Fallingwater House is a weekend house designed between 1935-1939 on a plot of land with a waterfall in Pennsylvania. The house, which was later transferred to an institution, is now a museum. The house was added to the World Heritage list by UNESCO in 2019.
Construction	There are no curvilinear lines, horizontal eaves, or a hipped roof in the design of the house. The building intersects with white prisms on the horizontal plane and natural stones on the vertical. There are horizontal white bands on their facades. By using a combination of stone and concrete in the building. There are also large windows on the facades and stairs made of concrete. The light-colored concrete railings of the terraces and verandas also draw attention to the house.
	Sustainability Parameters
Social Sustainability	Fallingwater House includes social sustainability parameters. Such as transportation, walkability, accessibility, and transportation by car.
Cultural Sustainability	Fallingwater House, Ohiopyle, Pennsylvania's building technique and building form shapes its architectural character. It has a valuable historical cultural value for cultural sustainability.
Environmental Sustainability	During the construction of the house, the design was carried out without ignoring its surroundings. The materials used in the construction of the house are compatible with its surroundings. Since environmentally friendly materials are used in its construction, the house still maintains its sustainability.
Economical Sustainability	Housing increases the value of the environment in which it is located. therefore it contributes to economic sustainability.



Sections
(Ruschak, P., 2023)

Example 6. Modern Architectural Approaches and Sustainability for Gropius House (1938)

The buildings, which included a manager's house and three twin houses, were given their names after the original occupants. Gropius was the first inhabitant of the executive home, hence the name "Gropius house" for the house (Canoğlu K., 2019).

The architect's first work in the country was The Gropius House, which Walter Gropius and the Gropius family lived in while he was a professor at Harvard University in the second half of the twentieth century. The mansion in Lincoln, Massachusetts, which was finished in 1938, originally combined traditional Massachusetts aesthetics with Bauhaus modernist principles. Gropius used conventional and contemporary elements in the building, which was principally inspired by the New England Farmhouse style. The Gropius House could be classified as highly "modest" because its size and physical identity were created in accordance with the surrounding area during the height of World War II and the rapid expansion of the contemporary architectural movement. On the facade of the house, there are also strip windows with glass blocks arranged parallel to each other with bricks and locally sourced wood cladding materials. In designing the interior of the home, Gropius combined Breuer's furniture designs with Bauhaus manufactured goods. After Walter Gropius's death in 1969, his family lived in Gropius House, which later became the property of the land's owner. The owner of the property is a great admirer of Gropius and is stated that it was Gropius's designs that inspired the later modernist buildings to be erected nearby. In 2000, the Gropius House was made a national monument in recognition of the architect's body of work (Şeren, 2017).

Gropius House has sustainability criteria including walkability, access by vehicle, and transit because of its location. The house is situated in an area that is easily accessible by both foot and car when evaluating social sustainability. These characteristics allow it to maintain its social sustainability even today. Designed in the modern period and carrying the criteria of the period, Gropius House shapes the architectural character of the region in the US state of Massachusetts with its building style and construction technique. Due to its historical and cultural characteristics, it carries the parameters of cultural sustainability. Gropius House is

located in a natural setting. Handling the functional style of modern architecture with local and modern building materials, the house is in harmony with its surroundings. In addition, simplicity was taken as a basis in environmental design. In this context, the building still maintains its environmental sustainability. Built-in the modern period, the house still maintains its economic sustainability due to its cultural and historical values. At the same time, it increases the value of the surrounding land and commercial and residential real estate. After being used as a house, the Gropius house now serves as a cultural center where Bauhaus furniture is exhibited. See Table 20.

Table 20

Modern Architectural Approaches and Sustainability for Gropius House (1938), (Author, 2023).

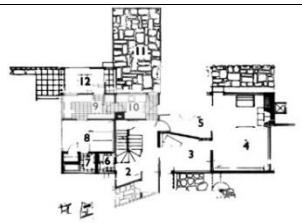
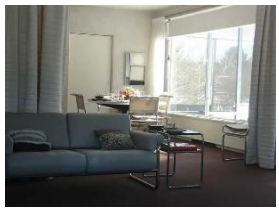
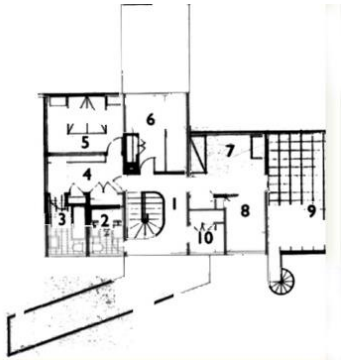
Massachusetts, America - 1938 - Walter Gropius House		
 Ground Floor Plan (Architectuul, 2023)	 Entrance Facade (Archeetect, 2023)	  Interior Spaces (Archeetect, 2023)
 First Floor Plan (Architectuul, 2023)	Form analysis	The Gropius House has sharp lines. The house reflects the Purism approach quite well. Besides, the house reflect International Style and Bauhaus movements. Strip windows are used on the facades. The house designed with the free plan technique has a flat roof. It carries the 5 principles that Le Corbusier created for modern architecture.
	Function	Walter Gropius built the Gropius House in New England, Massachusetts, for his family. Today, numerous important pieces produced by the Bauhaus school are on display in the 1938-completed building.
	Construction	In the house, traditional construction materials were used together with modern technology and industrial materials. Wood, brick, and cut stone materials were used in the building.
		Sustainability Parameters

Table 20 (Continued)

 Sections (Architectuul, 2023)	Social Sustainability	Gropius House has the parameters of sustainability such as walkability, car access and accessibility.
	Cultural Sustainability	Gropius House shapes the architectural character of the region in Massachusetts, USA, with its building form and building technique. Since it has historical and cultural characteristics, it carries the parameters of cultural sustainability.
	Environmental Sustainability	The Gropius House is located in a natural environment. The house, which deals with the functional style of modern architecture with local and modern construction materials, is in harmony with its surroundings. In this context, it maintains its environmental sustainability.
	Economical Sustainability	The house is increasing the value of the surrounding land, commercial and residential properties. Therefore, it contributes to economic sustainability. The Gropius house now serves as a cultural center.

Example 7. Modern Architectural Approaches and Sustainability for Farnsworth House (1946)

In Plano, Illinois, the Farnsworth House is located beside the Fox River. German architect Mies van der Rohe (1886-1969), who is regarded as one of the best practitioners of his generation, constructed it between 1945 and 1951. Open spaces were important to Mies, who also exposed the industrial components employed in his designs. In defining contemporary architecture, he played a significant part. He created The Farnsworth House, a building that perfectly captures his fanciful maxim "less is more" and his spartan way of thinking. Modern architecture is typified by the Farnsworth House. It was constructed as a getaway home for Dr. Edith Farnsworth (Campbell & Chiesa & Chung & Conlogue & Cordeiro & El Sydabi & Temprano, 2014).

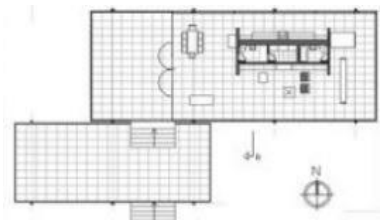
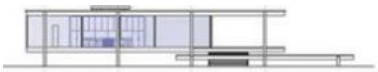
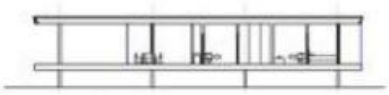
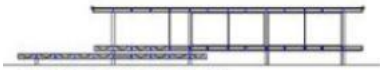
Farnsworth House (Illinois, 1945–1955), which featured early works created in Europe, signalled a change from later works created in America. The structure has been made lighter and is now positioned gently on the ground thanks to the tension that the floating horizontal surfaces (ceiling and floor) and oscillation struts (I Profile bearers) established with nature (Acar, 2004). Due to the possibility of floods, Mies van der Rohe lifted Farnsworth House, which is near the river, 1.5 meters above the ground. Four straightforward steel columns arranged in two rows support a pair

of horizontal slabs, one serving as the floor and another as the roof, both of which are rectangular in appearance. The steel columns with a H form are spaced apart by 6.7 meters. The walls were replaced with glass panels, which span the steel columns that support both the roof and the floor slab (Frampton, 2007). In order to get the most open area possible, Mies combined numerous steel frame systems in his rectangular-shaped Farnsworth House. Moffett & Fazio, M. & Wodehouse, 2003). Mies' maxim "less is more" is represented by the steel lattice house (Frampton, 2007). The house blends into the surroundings with all of its intricate elements, making it difficult to tell the difference between the inside and outside. As a result, the building has a poetic lightness with a distinct, fluid feeling of space that's rarely matched in architecture (Khan, H., 1998).

Since Farnsworth House is located in Plano, Illinois, about an hour west of Chicago, it carries the parameters of social sustainability such as transportation, accessibility, and walkability. Farnsworth House shapes the architectural identity of the Plano region with its construction technique and building style. Considering its historical process, it has cultural and historical features. In this context, it carries the parameters of cultural sustainability. Since the four facades of the building are open, the living spaces are related to its surroundings. Thus, living spaces are in contact with the natural environment. In the house, where the interior-exterior relationship was successfully established, the materials of modern architecture and traditional materials were blended. In light of all this, Farnsworth House maintains its environmental sustainability. Farnsworth House increases the commercial, residential, and land real estate values of its location. In this context, it contributes to economic sustainability. Thanks to the visitors of the house returning to the museum 50 years after its construction, it also contributes to its environment economically. See Table 21.

Table 21

Modern Architectural Approaches and Sustainability for Farnsworth House (1946), (Author, 2023).

<table>
<tr><th colspan="3">Plano, Illinois - 1946 - Ludwig Mies van der Rohe House</th></tr>
<tr><td> 
Ground Floor Plan
(Wheeler, 2016)</td><td colspan="2"> 
Entrance Facade
(Perez, 2010)</td><td>  
Interior Spaces
(Perez, 2010)</td></tr>
<tr><td rowspan="4">  
Elevation
(Wheeler, 2016)</td><td>Form analysis</td><td colspan="2">Farnsworth House has all the features of the modern period and International Style. Free openings attract attention to the house designed with the concept of free space. Each facade is covered with glass to eliminate the interior-exterior distinction. There are two wide staircases in the House, which were designed from a pure, simple, rectangular prism. One connects the earthen floor to the terrace and the other connects the terrace to the veranda.</td></tr>
<tr><td>Function</td><td colspan="2">Farnsworth House, which was used as private property for nearly 50 years, was purchased by the National Trust for Historic Preservation in 2013 and turned into a museum.</td></tr>
<tr><td>Construction</td><td colspan="2">The house is designed with steel framed construction. Steel columns support the roof slab and floor. In addition, the fact that there are almost no walls on the facades and the design of large windows draws attention.</td></tr>
<tr><td></td><td colspan="2">Sustainability Parameters</td></tr>
<tr><td rowspan="4">  
Section
(Wheeler, 2016)</td><td>Social Sustainability</td><td colspan="2">Located in Plano, Illinois, about an hour west of Chicago, Farnsworth House has the parameters of sustainability such as walkability, transportation by vehicle, and accessibility.</td></tr>
<tr><td>Cultural Sustainability</td><td colspan="2">Farnsworth House shapes the architectural identity of the Plano region with its construction technique and building form. Since it has both cultural and historical features, it carries the parameters of cultural sustainability.</td></tr>
<tr><td>Environmental Sustainability</td><td colspan="2">Open view from all sides of the building helps expand the living space area and facilitates the flow between the living area and its natural surroundings. Reflecting the functional style of modern architecture with modern and local construction materials, the house is very intertwined with its surroundings. Accordingly, it maintains its environmental sustainability.</td></tr>
<tr><td>Economical Sustainability</td><td colspan="2">The house increases the value of the commercial, land, and residential real estate around it. In this context, it contributes to economic sustainability. Farnsworth House now serves as a museum after 50 years.</td></tr>
</table>

Example 8. 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).

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 22.

Table 22

Modern Architectural Approaches and Sustainability for Mısırlızade House (1968-72), (Author, 2023).

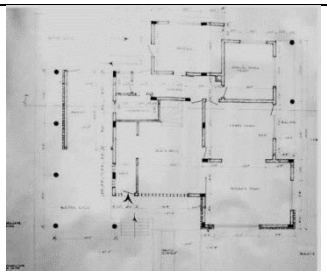
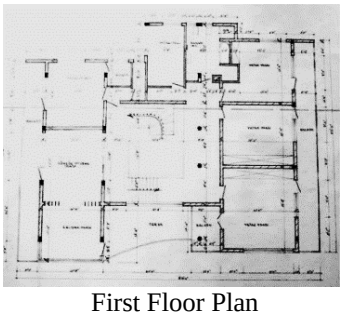
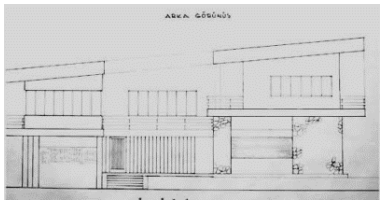
<table>
<tr><th colspan="3">Köşklüçiftlik, Nicosia - 1968-72 - Abdullah Onar House</th></tr>
<tr><td colspan="2"> 
Ground Floor Plan
(Yavuz, 2021)</td><td> 
Entrance Facade
(Yavuz, 2021)</td></tr>
<tr><td rowspan="3"> 
First Floor Plan
(Yavuz, 2021)</td><td>Form analysis</td><td>The Mısırlızade House was designed in the form of a mass, with a simple and free plan technique, in a symmetrical manner. It is in the form of a plain white cube, away from decorations. The interiors are designed to flow openly and intertwine. There are wide band windows on their facades. Housing has the characteristics of rationalism, functionalism, purism, cubism, and international style, which are the currents of the modern period.</td></tr>
<tr><td>Function</td><td>The building, which was designed as a house, still functions as a house today.</td></tr>
<tr><td>Construction</td><td>The building is made of reinforced concrete and painted in white. The roof is designed as a terrace roof. The left side of the building was designed on the pilots and a garage area was created below. Large windows and eaves on the facade attract attention.</td></tr>
<tr><td colspan="2"></td><td>Sustainability Parameters</td></tr>
<tr><td rowspan="2"> 
Front Elevation
(Yavuz, 2021)</td><td>Social Sustainability</td><td>Located in Nicosia Köşklüçiftlik, the house has sustainability parameters such as walkability, transportation and accessibility.</td></tr>
<tr><td>Cultural Sustainability</td><td>With its construction technique and building style, Mısırlızade House shapes the architectural identity of the region it is located in. Since it has both cultural and historical characteristics, it carries the parameters of cultural sustainability.</td></tr>
</table>

Table 22 (Continued)

	Environmental Sustainability	Due to the large windows and wide terraces designed on its facades, the house establishes a relationship with its surroundings. It is very intertwined with its surroundings as it reflects the functional style of modern architecture with modern and local building materials. In this direction, it maintains its environmental sustainability.
	Economical Sustainability	The house increases the value of commercial, land, and residential real estate in its vicinity. Thus, it contributes to economic sustainability.

Example 9. 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). 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.

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 façade, 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).

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 23.

Table 23

Modern Architectural Approaches and Sustainability for Suna-Ümit Süleyman House (1960), (Author, 2023).

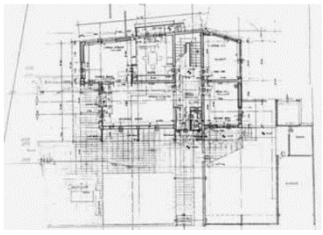
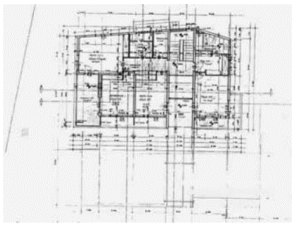
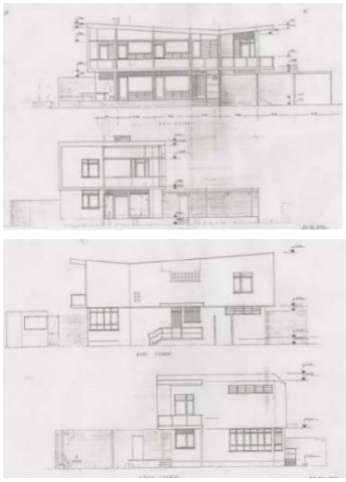
<table>
<tr><th colspan="4">Köşklüçiftlik, Nicosia - 1960 - Ahmet Vural Behaeddin House</th></tr>
<tr><td> 
Ground Floor Plan
(Uluçay & Uraz & Pulhan, 2006)</td><td colspan="2"> 
Entrance Facade
(Uluçay & Uraz & Pulhan, 2006)</td><td>  
Interior Spaces
(Uluçay & Uraz & Pulhan, 2006)</td></tr>
<tr><td> 
First Floor Plan
(Uluçay & Uraz & Pulhan, 2006)</td><td>Form analysis</td><td colspan="2">The house was designed with the free plan technique. It attracts attention with its cube form that is free from ornaments. Interior spaces are open and fluid. The large windows on the facades and the exterior relationship have been successfully established. It carries the features of functionalism, rationalism, brutalism, purism, cubism and international style from the approaches of the modern period.</td></tr>
</table>

Table 23 (Continued)

	Function	The building, which was designed as a house, still functions as a house today.
	Construction	With the white paint and pure concrete used on its facades, the house is in a whole with the gray iron railings designed on the upper floor balconies. The entrance wall are designed with red bricks and attract attention. In addition, pure concrete is used on the entrance facade and the interior. Beams were not used in the flooring of the house, which was built with the reinforced concrete construction technique. The sloping roof has brought mobility to the facades.
		Sustainability Parameters
 Elevations (Mesda, 2011)	Social Sustainability	The house, which is in Nicosia Köşklüçiftlik, meets sustainability parameters for accessibility, walkability, and transportation.
	Cultural Sustainability	The House shapes the region's architectural identity through its building style and construction method. It carries the parameters of cultural sustainability because it possesses both cultural and historical traits.
	Environmental Sustainability	The relationship of the house with its surroundings is provided by large windows and terraces. It reflects the functionality of the modern period with the modern and local materials and techniques used in the design of the house. Thus, it has achieved harmony with its environment and maintained its environmental sustainability.
	Economical Sustainability	The house is raising the value of the vicinity business, lands, and residential real estate. In this way, it makes contributes to economic sustainability.

Case Study Area

Modern Architecture in North Nicosia, Cyprus

Although the exact date of Nicosia's founding is unknown, it is believed that the city, known as Ledra in Assyrian texts from the seventh century AD, served as the foundation for 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 Transportation Mor & Çitçi, 2007). 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 Transportation Özdemir, 2018).

On the sea passage to India, the island provided Britain with a crucial military base. The island was totally seized by Britain in 1914, and it became a crown colony with in 1925. In 1882, Nicosia's first contemporary municipal council was founded by British authorities. Beginning in 1923, the city's municipal boundaries were expanded outside the city walls by annexing surrounding villages (Shtern & Sonan & Papasozomenou, 2022). After the II. World War, Nicosia quickly grew, and by the early 1960s, its population had surpassed 100,000. Between 1946 and 1965, the city had increased prosperity, and both of the main ethnic groups constructed new residential neighbourhoods beyond the city walls (Oktay, 2007).

Architectural languages differed between the 1920s and the 1970s (Fereos & Phokaides, 2006 Transportation 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 S. & Feridun, A., 2013). Cypriot architects at that time started to create their individual architectural companies in Nicosia after completing their studies in England and Turkey. It has been indicated that they sought to practice under difficult conditions or continued their profession at government agencies throughout as a result of the tense atmosphere between the two communities, particularly in 1957, 1958, and 1959 (Cogaloglu & Turkan, 2019). 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. After the 1970s, apartment-style

dwellings became more widespread. Housing units independent, were built by professionals' individual (Oktay, 2019). 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. Due to North Cyprus's financial problems, land prices started to grow after 1975 in a way that was beyond proportion to people's purchasing power, making it extremely difficult for them to buy private homes that were meant to meet their requirements. The solution to the problem led to the creation of high-rise and low-rise structures with standard floor plans. Thus, people were compelled to purchase rise-low and rise-low structures that weren't appropriate for their needs by both government social housing regulations and the build-and-sell practices of the private sector (Cogaloglu & Turkan, 2019).

Research Area

Cyprus has been affected by different civilizations over the course of its history. Due to its advantageous geographical position, the island has been able to successfully integrate Eastern and Western civilizations into its legacy. Its architectural style also reflects its rich cultural heritage and historical past. Today, a variety of architectural styles from many periods have been seen. The Republic of Cyprus was established in 1960 after the British government came to power. The island has since 1974 followed a bi-regional settlement policy (Oktay, 2007). See Figure 9.

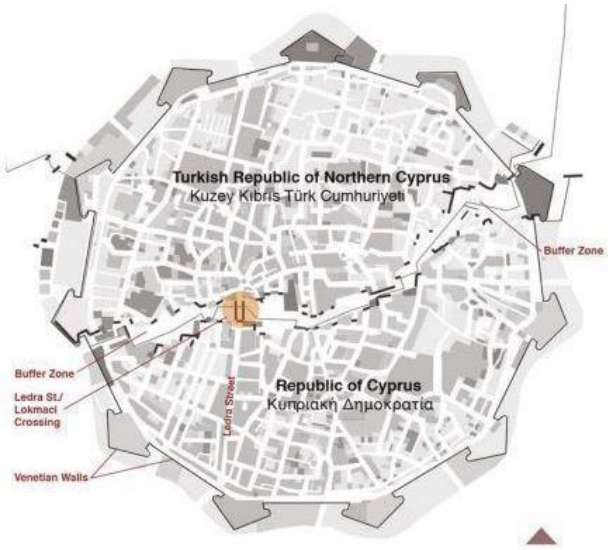
Figure 9

Map of Cyprus with the United Nations Buffer Zone, (Günçe & Mısırlısoy, 2019).

Nicosia has been the capital of the island of Cyprus for many years. It is the last divided city of Europe, which is also the largest city on the island of Cyprus and known as Lefkosia in Greek and Nicosia in Turkish. See Figure 10. The medieval Nicosia walls that encircle the city's historic center are split in two, mirroring the geographical division of the island. Since it is a city with remnants of the histories and cultures of numerous civilizations, it has been the focus of numerous studies (Bakshi, 2014). Nicosia began to expand quickly in the final years of British colonial rule (1878–1960), particularly in the decades following World War II. Residential settlements were established outside of the walled city throughout time (Günçe & Mısırlısoy, 2019).

Figure 10

Map of Nicosia, (Mesda, 2011).



Research Design

In the methodological approach, theoretical, analysis/practical approaches and observations were followed. In the theoretical approach stage, modern architecture, modern architectural approaches, and sustainability issues are discussed. Accordingly, the theoretical framework of the research was formed. At the analysis/practical approach stage, the current analysis of the modern period houses in the Kumsal/Nicosia region, which was determined as the subject of the study, was made by on-site inspections. Plan and elevations technical drawings of the houses were made, and facade and interior spaces photographs were taken. According to the

investigation, it was determined that there are 5 different types of houses. These houses were named as A, B, C, D and E type houses. It was determined that the function of 1 house in A type and 3 houses in E type changed. The current plans and views of all the houses with functional changes were drawn. The changes made in the houses that were changed functional changes are indicated on the plans by painting them in different colours. In the practical approach phase, data revealing the physical and environmental conditions of the selected buildings were collected. The collected data were assessed by modern architecture criteria. Furthermore, these data were observed and evaluated within the context of sustainability parameters, encompassing social, cultural, environmental, and economic aspects.

Population and The Sample

In this study, Kumsal region, which is a developed region of North Nicosia, was chosen as the sample. This part of the city is an important region where residential areas are dense, commercial areas are developed and business centers are located. In addition, the neighbourhoods in this region cover a large part of the population. In 2011, the Northern Cyprus State Planning Organization determined the population of the Kumsal region as 1855.

In the selected region, primarily modern period houses were determined. In addition, the period houses located on the axis where the region is most used were analysed in detail in terms of their location and the area they cover. These analyses were made with theoretical, analysis/practical and observation methods, taking into account the criteria, approaches, and sustainability parameters of modern architecture.

A sample of thirty-one houses was selected for the thesis. These houses are located on three streets, namely Meriç Street, Tuna Street, and Tuncer Hasan Street. Twenty-seven of the thirty-one houses have retained their functions, while four have changed their functions. Since the number of houses in the three selected streets is almost equal, five types of housing examples are listed within the scope of the study.

Data Collection Tools/Materials

Observation of the selected region within the scope of the thesis, analysis, and evaluation of similar samples are the main tools of data collection in the study. Google Earth, auto CAD, and photoshop software are the materials used in this study. Google Earth was used to show and analyze the selected region on the map and to support the study visually. Auto CAD is used as software to analyze fieldwork and redraw plans, sections, and views; As a result of this, the plan typologies of the existing row houses were determined. Photoshop software was used to improve the photographs included in the whole study.

Study Plan

The content of the flashcards was created in light of the theoretical framework that emerged after the literature review. In the selected Kumsal region, in the first two weeks of November 2022, firstly, the surveys of the houses that underwent a function change were taken; Exterior and interior photos were taken.

In the third week of November 2022, one of the housing types that did not change function was selected and their surveys were taken; Exterior and interior photos were taken.

In the last week of November 2022 and in the process of December 2022, current drawings of the houses were made in the Autocad program in line with the surveys taken.

In January 2023, information cards were filled.

All the findings, evaluation, analysis and research will shed light on the conclusion and recommendations of this study.

Kumsal Field Study

This study focuses on the Kumsal region, which is a densely populated area with business, leisure, and residential districts and is situated between Mehmet Akif Caddesi (Dereboyu) and Bedrettin Demirel Avenues. See Figure 11. Ahmed Vural Behaeddin, who was one of the top architects of the period, designed the Efruz Houses (Müdüroğlu Houses), which served as the subject of the field research. Efruz S. Müdüroğlu was the contractor of the Efruz row houses, which had been designed by architect Ahmed Vural Behaeddin. These row homes are referred to as the Efruz houses for this reason. See Figure 12-13.

Figure 11

Map of Kumsal district, (Google Earth 2023, edited by author).

Figure 12

Kumsal map, it shows Efruz Houses (Müdüroğlu Houses), (Google Earth 2023, edited by author).

Figure 13

Social and Environmental view of Efruz Houses Street (Müdüroğlu Houses), (Author, 2023).

This study's scope investigation of Efruz row houses (Müdüroğlu Houses), which were designed in Nicosia's North during the time when the modern period began to be felt. In the Nicosia region of Kumsal, Efruz Houses were designed as an overall of 31 residential buildings. The houses feature five different plan designs and were constructed using reinforced concrete building methods and a two-story row house approach. The square meters of the houses vary between 250 - 300 square meters depending on their typologies. Four of the homes have undergone functional changes, but 27 of the structures still continue the same function today. In houses that have undergone functional modifications, it has been observed that some modern-era characteristics have been partially lost. 31 homes were found to be built in five different construction forms (Type-A/Type-B/Type-C/Type-D/Type-E) in five separate blocks in the regional analysis. B, C and D types did not change to blocks whose functions remained constant. Within the scope of the investigation, blocks with altered functions are categorized as A and E types. It has a single structure (the A-type) and three shifting structures (the E-type).

Findings of the Modern Architectural Criteria and Sustainability Parameters of the Efruz Houses

Efruz Houses show evidence of adopting modern approaches and architectural criteria of the 1960s. By looking at the modern architectural criteria and sustainability parameters, the analysis of Efruz Houses will be revealed by examining them. In the setting of modern period architectural criteria, Efruz Houses

(Müdüroğlu Houses), built as five types, will have their criteria thoroughly assessed in regard to form, function, as well as construction. In the analysis of the homes, architectural approaches have been attempted to be revealed. The sustainability parameters for Efruz Houses will also be examined, according to environmental, social, economic, and cultural sustainability.

In order to reflect the effects of the modern age, Ahmed Vural Behaaddin, who was one of Cyprus' most prominent modern architects, utilized straight and crisp lines in his creations. In the expansive terraces created in houses with various plan organization, it is possible to observe the open-floor plan concept and the interior-exterior coherence concept of the modern period. Reinforced concrete, a key component of modern architecture, along with local stone and the color white, representing modernism's austerity, were used in the design of Efruz row houses. These structures have a two-floor structure, and their roofs are constructed using the sloped/pitched roofing technique

The sustainability of Efruz Houses has an important on their region. The Efruz Houses are situated in Nicosia's city center. The Efruz Houses in the Kumsal region have business centers, retail malls, restaurants, and hotels nearby, which raises the value of the houses as properties. A great deal of Efruz Houses, which had been constructed using modern period criteria and techniques, still continue to uphold their sustainability today. The structures make a significant contribution to the region's social, cultural, economic, and environmental sustainability in this context.

Efruz row houses still uphold their sustainability today because they were designed by the esteemed architect of the time, Ahmed Vural Behaeddin, about half a century ago and incorporated the architectural criteria and approaches in the modern period as well as the sustainability parameters that later emerged.

Since they were designed by the renowned architect of the period, Ahmed Vural Behaeddin, about 50 years ago and incorporated both the architectural approaches and criteria of the modern period as well as the sustainability criteria that later emerged, Efruz row houses continue to uphold their sustainability today. Following that, data cards for the examination of homes with five various building

kinds were created. In accordance with modern architecture criteria and sustainability criteria, an analysis of the original houses was done in one table, and analyses of the houses that changed function were done in four tables. According to all of the investigations and analyses, Tables 24, 25, 26, 27, and 28 provide an assessment of the sustainability parameters and modern architectural criteria for Efruz row dwellings.

Table 24

The evaluation of modern buildings within the sustainability parameters and modern architectural criteria.

Evaluation of Modern Buildings Within the Sustainability Parameters and Modern Architectural Criteria		
Evaluated Building	**Sustainability Parameters**	**Evaluation**
Neighborhood Name: Kumsal Zone **Type of Efruz Houses**: Row and Attached Houses	**Street Name:** Meriç Street / Tuna Street / Tuncer Hasan Street	
  **Efruz Houses (Müdüroğlu Houses) Year:** 1963-1974	**Social Sustainability**	In these modern houses, social sustainability parameters include density, functionality, walkability, neighbourhood relationships, social benefits, and such as accessibility by vehicle transportation.
   	**Cultural Sustainability (Parameters)**	These buildings, which were designed in the modern period, are a historical cultural value that determines the architectural and cultural identity of the region with its architectural style, building form, and construction technique in the context of cultural sustainability.

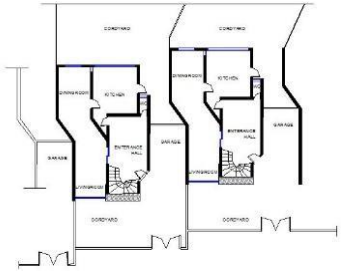
Environmental Sustainability (Parameters)

Efruz houses, designed in the modern period, were built in an environmentally friendly and harmonious manner. It has been designed by establishing a relationship with the indoor and outdoor environment to form a whole. When we evaluate the building materials used in the design in the context of environmental sustainability, it has been observed that they are built as durable and environmentally friendly building materials.

Economical Sustainability (Parameters)

These houses, which were built in the modern period and carry cultural value, maintain their economic sustainability because they are built with up-to-date construction materials. It creates a tourist attraction center by increasing the land value and residential property values of the surrounding area. Since its environmental sustainability continues due to its location, it continues to contribute to economic sustainability.

Architectural Space Criteria	**Evaluation (Architectural Criteria)**
Form	**Spaces Analysis**



Ground Floor Spaces:

Courtyard
Garage
Entrance Hall
Livingroom
Dining Room
Kitchen
Studying Room
Wc

First Floor Spaces:

3 Bedrooms
Bathroom
2 Balconies

Form Analysis:

The plan design consists of straight, simple, and sharp lines. They have an exemplary approach to geometric forms and symmetrical plans. They include functionalism, cubism, De-Stijl, and Bauhaus approaches. The buildings have been observed that they have an open-plan design application. It reflects the structural plan features in which the internal-external relationship is established.

Function **Original Function:** 31 Houses **Today Function:** 27 Residential Houses (in good condition, without damages), and 4 Houses (have different functions)	Efruz houses consist of 31 buildings in total. While 27 buildings retain their original house function, 4 buildings have changed their functions. Re-functioning structures are used as human resources office, insurance agency, information technology office, and private bank.
Construction **Sturucture/ Material:** Concrete, Plaster, Dye, Glass, Iron Railings, White Fire Brick, Stonewall Facade	Traditional natural stone material was used on the facade. There is no ornamentation in the facade designs. Rectangular, large window openings are striking on the facades. The buildings have a tile roof construction technique as 2 floors, adjacent to the garage connection.

Table 25

The evaluation of the sustainability parameters and modern architectural criteria of the Insurance Agenc

Evaluation of Modern Buildings Within the Sustainability Parameters and Modern Architectural Criteria (Buildings that are modifying their functions)			
Evaluated Building		**Sustainability Parameters**	**Evaluation**
Neighborhood Name: Kumsal Zone **Type of Efruzses**: Row and Attached Houses		**Street Name:** Tuncer Hasan Street	
TPE A INSURANCE AGENCY	**Orginal Function:** Efruz House (Müdüroğlu Houses) **Year:** 1963-1974	**Social Sustainability**	In the Efruz housing structure (Insurance Agency) which is classified as type A, social sustainability has parameters such as density, functionality, walkability, accessibility, social benefits, neighbourhood relationships, and transportation by vehicle.
 The location of the structure whose function has changed on the map		**Cultural Sustainability (Parameters)**	This modern building, which has undergone a functional change, is evaluated in the context of cultural sustainability, its architectural style, building style, and construction technique have been preserved, and the preservation of its architectural identity and therefore cultural sustainability has continued.
		Environmental Sustainability (Parameters)	When the insurance agency building is evaluated within the scope of environmental sustainability, the durable and environmentally friendly materials used in its design have not changed despite the changing function of the building. It has been observed that the building, which is associated with its internal and external environment as a whole, has maintained its environmental sustainability until today.
		Economical Sustainability (Parameters)	The Insurance agency building, which preserves its modern identity and was built with up-to-date construction materials, continues to maintain its economic structure at today's standards. Since this building, which has undergone a functional change, has architectural, economic and cultural value, it has been changed by preserving the existing original construction criteria and the real estate value of the building has increased.

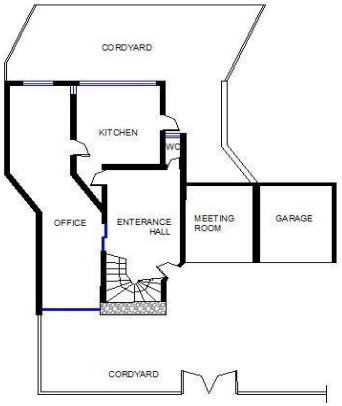
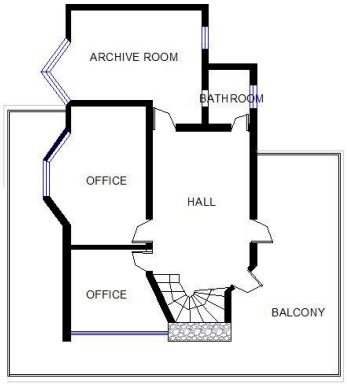
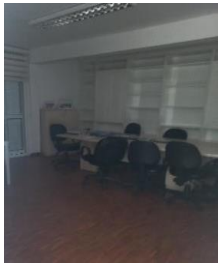
Architectural Space Criteria	Evaluation (Architectural Criteria)
Form	**Spaces Analysis**
 Ground Floor plan	**Ground Floor Spaces:** Courtyard Garage Entrance Hall Offices Wc Kitchen 
 First floor Plan	**First Floor Spaces:** Manager Office Offices Bathroom Corridor 2 Balconies 
 Front Elevation  Back Elevation	**Form Analysis:** The plan design of this building, which has changed a functional change, has been preserved and the spaces have been re-functionalized. The plan design consists of straight, simple, sharp lines and open plan organization. It preserves functionalism, cubism, De-Stijl, and Bauhaus approaches. It reflects the structural plan features in which the internal-external relationship is established.
Function **Original Function:** House **Today Function:** Insurance Agency in Tuncer Hasan Street (The House number 21)	The original function of the building is residential. Today, it has been converted into an office by an insurance company.
Construction **Sturucture/ Material:** Stone Wall**,** Concrete, Plaster, Dye, Glass, Iron Railings,White Fire Brick	The original facade of the building is structurally not changed. The original construction materials of the existing building have been preserved in the insurance building, which has changed a functional change. To symbolize the colour of the institution, the roof eaves are painted green in the facade design.

Table 26

The evaluation of the sustainability parameters and modern architectural criteria of the Hotel's Human Resources Office.

Evaluation of Modern Buildings Within the Sustainability Parameters and Modern Architectural Criteria (Buildings that are modifying their functions)			
Evaluated Building		**Sustainability Parameters**	**Evaluation**
Neighborhood Name: Kumsal Zone **Type of Efruz Houses**: Row and Attached Houses		**Street Name:** Meriç Street	
TYPE E Hotel's Human Resources Office	**Orginal function:** Efruz House (Müdüroğlu Houses) **Year:** 1963-1974	**Social Sustainability**	Efruz housing structure (Hotel's human resources office), classified as type E, has parameters such as social sustainability, walkability, neighbourhood relationship, accessibility, transportation by vehicle, functionality, and social benefits.
 The location of the structure whose function has changed on the map	 Front View	**Cultural Sustainability (Parameters)**	The human resources building, which has undergone a functional change, was evaluated in terms of cultural sustainability, and the addition made to the facade design caused the partial loss of its architectural identity and cultural value.
		Environmental Sustainability (Parameters)	The building is evaluated within the scope of environmental sustainability, and it has been observed that it partially maintains its environmental sustainability since it was built with environmentally friendly and environmentally compatible materials in the modern period. The additions made to the front and rear facades after the functional change caused partial deterioration of both the construction materials and the visual layout of the building. It has also partially severed the relationship between the inside and the outside.
		Economical Sustainability (Parameters)	It was observed that the sustainability of the original facade design and construction materials was changed by adding additional building extensions to the ground floor front and rear facade designs of the human resources office building, which was designed with modern period materials. With the change, the economic sustainability of this structure was partially damaged.

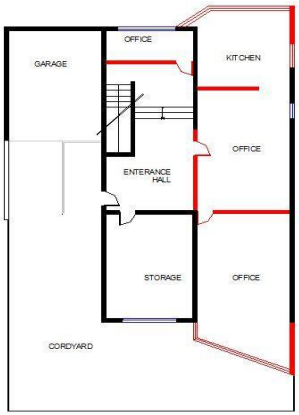
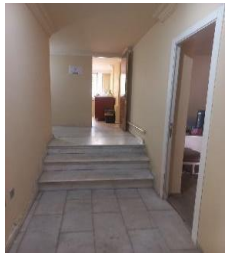
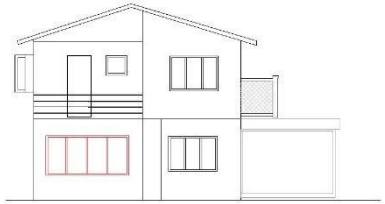
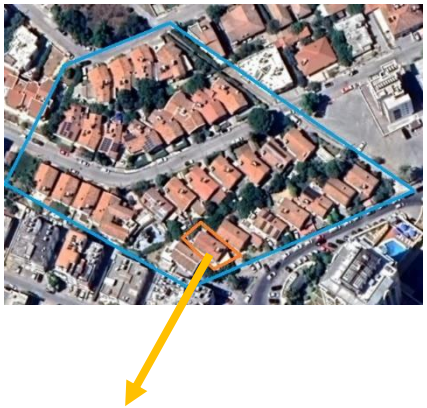
Architectural Space Criteria	Evaluation (Architectural Criteria)
Form	**Spaces Analysis**
 Ground Floor Plan  First Floor Plan	**Ground Floor Spaces:** Courtyard Garage Entrance Hall Offices Kitchen Wc Storage  **First Floor Spaces:** Manager Room Human Resources Office Bathoom 2 Balconies 
 Front Elevation  Back Elevation	**Form Analysis:** The human resources office of a private hotel changed functional changes and has different space division changes in the ground floor plan, while the original building space divisions are preserved in the upper floor plan. The living room and dining area, which were designed in an open plan type on the ground floor of the building, were converted into 2 office spaces after the change in function. The section, which was designed as a dining area in the original building design, was changed by enlarging it towards the front. The section, which was designed as a living room in its original design, has been enlarged towards the backward facade. It preserves functionalism, cubism, De-Stijl, and Bauhaus approaches. The spaces that have changed in the plan design are marked in red in the plan shown in the table.
Function **Original Function:** House **Today Function:** Merit Nicosia Hotel Office in Meriç Street (The House number14)	The original function of the building is residential. Today, it has been converted into an office by a human resources office
Construction **Structure/ Material:** Concrete, Plaster, Dye, Glass, iron railings	The original facades of the building have been structurally altered. These changes are due to the enlargement of the dining area towards the front façade and the closing of the terrace facing the rear façade of the living room and its inclusion in the ground floor plan. On the other facades, the original building materials of the existing building have been preserved.

Table 27
The evaluation of the sustainability parameters and modern architectural criteria of the Information Technology Office.

Evaluation of Modern Buildings Within the Sustainability Parameters and Modern Architectural Criteria (Buildings that are modifying their functions)			
Evaluated Building		**Sustainability Parameters**	**Evaluation**
Neighborhood Name: Kumsal Zone **Type of Efruz Houses**: Row and Attached Houses		**Street Name:** Meriç Street	
TYPE E Information Technology Office	**Orginal function:** Efruz House (Müdüroğlu Houses) **Year:** 1963-1974	**Social Sustainability**	Efruz housing structure (Information Technology office), which is classified as E type, has criteria such as social sustainability parameters, walkability, density, accessibility, social benefits, neighbourhood relationships, and transportation by vehicle.
 The location of the structure whose function has changed on the map	 Front View	**Cultural Sustainability (Parameters)**	When the Information Technologies Office structure, which is classified as type E and has undergone functional changes, is evaluated in the context of cultural sustainability parameters, the changes in its architecture, approach and technique have caused a partial change in both its architectural and cultural identity and cultural sustainability.
		Environmental Sustainability (Parameters)	When the information technologies office building is evaluated within the scope of environmental sustainability, the upper covering designed in addition to the original structure at the left entrance door and the addition of space to the rear facade partially changed the environmental sustainability. It has also partially severed the relationship between the internal and external environment. In addition, the construction materials used in the design have partially changed their durability and environmentally friendly building materials in the context of environmental sustainability.
		Economical Sustainability (Parameters)	This building, which was built with modern construction materials, spoiled the original building identity with the top covering material added to the left facade design and the additional structure added to the rear facade. In addition, these additions partially damaged the construction materials of the building. With the change, the economic sustainability of this structure was partially damaged.

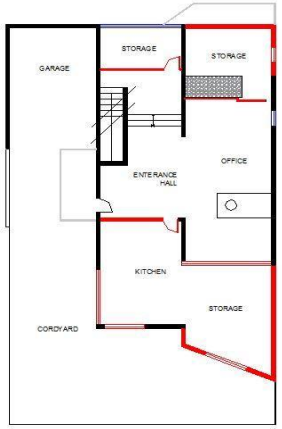
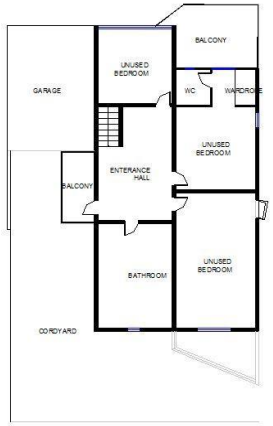
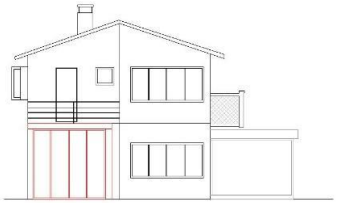
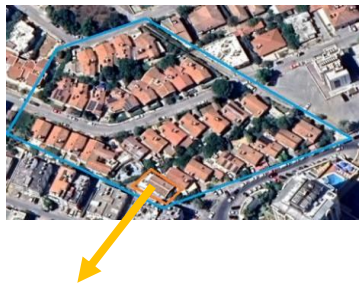
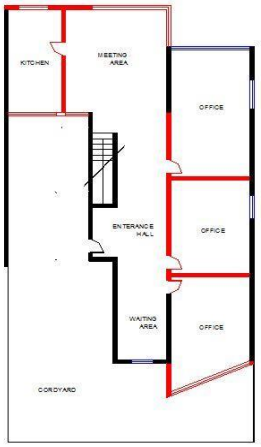
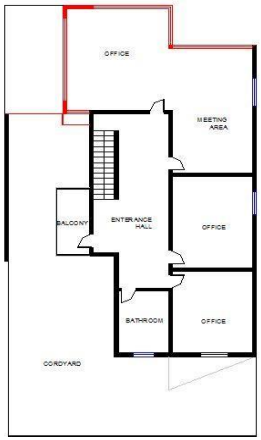
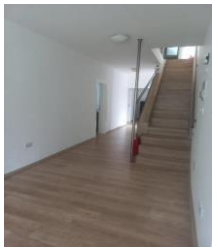
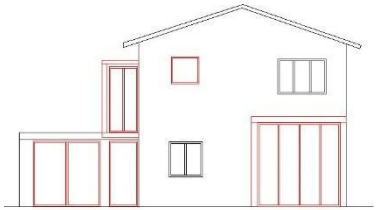
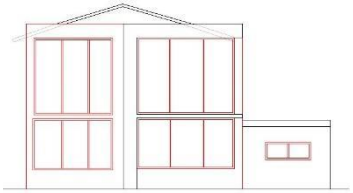
Architectural Space Criteria	Evaluation (Architectural Criteria)
Form	**Spaces Analysis**
 Ground floor Plan  First floor Plan	**Ground Floor Spaces:** Courtyard Garage Entrance Hall Offices Kitchen Wc Storage  **First Floor Spaces:** 3 Unused Bedroom Bathoom Corridor 2 Balconies 
 Front Elevation  Back Elevation	Form Analysis: The spaces have been re-functionalized with the changes made in the plan design of the IT Office, which has changed functional changes. The additional room added to the back of the ground floor plan of the building changed the original building identity of Efruz houses. The section, which was designed as a dining area in the original building design, was changed by enlarging it forward. It preserves functionalism, cubism, De Stijl, and Bauhaus approaches. The changed spaces in the plan design are marked in red in the plan shown in the table.
Function **Original Function:** House **Today Function:** Information Technology Office in Meriç Street	The original function of the building is residential. Today, it has been converted into an Information Technology office.
Construction **Sturucture/ Material:** Concrete, Plaster, Dye, Glass, iron railings	The original facades of the building have been structurally altered. These changes are due to the enlargement of the ground floor plan of the building towards the front and rear facades. The top covering element designed in addition to the original structure on the left side entrance door of the building has damaged the original identity of this building. On the other facades, the original building materials of the existing building have been preserved.

Table 28

The evaluation of the sustainability parameters and modern architectural criteria of the Private Bank.

Evaluation of Modern Buildings Within the Sustainability Parameters and Modern Architectural Criteria (Buildings that are modifying their functions)

Evaluated Building		Sustainability Parameters	Evaluation
Neighborhood Name: Kumsal Zone **Type of Efruz Houses**: Row and Attached Houses		**Street Name:** Meriç Street	
TYPE E Private Bank	**Orginal function:** Efruz House (Müdüroğlu Houses) **Year:** 1963-1974	**Social Sustainability**	Efruz housing structure (Mondial Private Bank), which is classified as E type, has criteria such as social sustainability parameters, density, functionality, neighbourhood relationships, walkability, accessibility, social benefits, and transportation by vehicle.
 The location of the structure whose function has changed on the map	 Front View	**Cultural Sustainability (Parameters)**	When the Mondial Private Bank structure, which is classified as type E and has undergone functional changes, is evaluated in the context of cultural sustainability parameters, the changes in its architecture, approach and technique have caused changes in both architectural and cultural identity and cultural sustainability.
		Environmental Sustainability (Parameters)	When the Mondial private bank building is evaluated within the scope of environmental sustainability, as a result of the expansion of the space designed in addition to the original structure on the left and right facades of the building, the original construction materials of the building were damaged and lost its harmony with its environment. In addition, the building has lost its relationship with the interior and exterior. Thus, the environmental sustainability of the building has been greatly damaged.
		Economical Sustainability (Parameters)	The Mondial Private Bank, which was built with modern-period construction materials, has damaged the original architectural identity of the building due to the size of the space added to the building form. The economic sustainability of the building has been completely disturbed by all the form and material changes made by ignoring the approach and criteria of the modern period.

Architectural Space Criteria	Evaluation (Architectural Criteria)
Form	**Spaces Analysis**
 Ground Floor Plan  First Floor Plan	**Ground Floor Spaces:** Courtyard Entrance Hall Offices Kitchen Wc Storage 
	First Floor Spaces: Manager Room Offices Bathoom Corridor 2 Balconies 
 Front Elevation  Back Elevation	**Form Analysis:** A private bank that has changed a functional change has changed the space divisions in the original building design. These changes were made in the ground floor plan as a different space division and add additional space design. The space added to the ground floor plan has turned into a new space design in the upper floor plan on the same level. The living room and dining area, which were designed in an open plan type on the ground floor of the building, were transformed into 3 office spaces after the change in function. The section, which was designed as a dining area in the original building design, was changed by enlarging it forward. It partially preserved the approaches of functionalism, cubism, De-Stijl, and Bauhaus. The spaces that have changed in the plan design are marked in red in the plan shown in the table.
Function **Original Function:** House **Today Function:** Private Bank in Meriç Street	The original function of the building is residential. Today, it has been converted into a Private Bank.
Construction **Sturucture/ Material:** Concrete, Plaster, Dye, Glass, iron and glass railings	There have been some changes in the original facade designs of the building. These changes are due to the enlargement of the dining area towards the front and the room located at the back of the staircase to be enlarged towards the backward and included in the ground floor plan. The additional addition made on the ground floor plan on the back facade was enlarged on the same level as the upper floor plan. The original facade materials have been changed on the interior and exterior.

CHAPTER IV

Findings and Discussion

In this part of the thesis, all the findings are presented and discussions are made. Based on the data collected throughout the study, this section aims to provide a clear analysis of the data and also to present the analysis findings with explanations.

Analysis of the Modern Architectural Criteria of the Efruz Houses

Form

The Efruz Houses are two-story structures 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 Houses (Müdüroğlu Houses) have 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. Attention is drawn to the direct connection as well as spatial flow between all spaces.

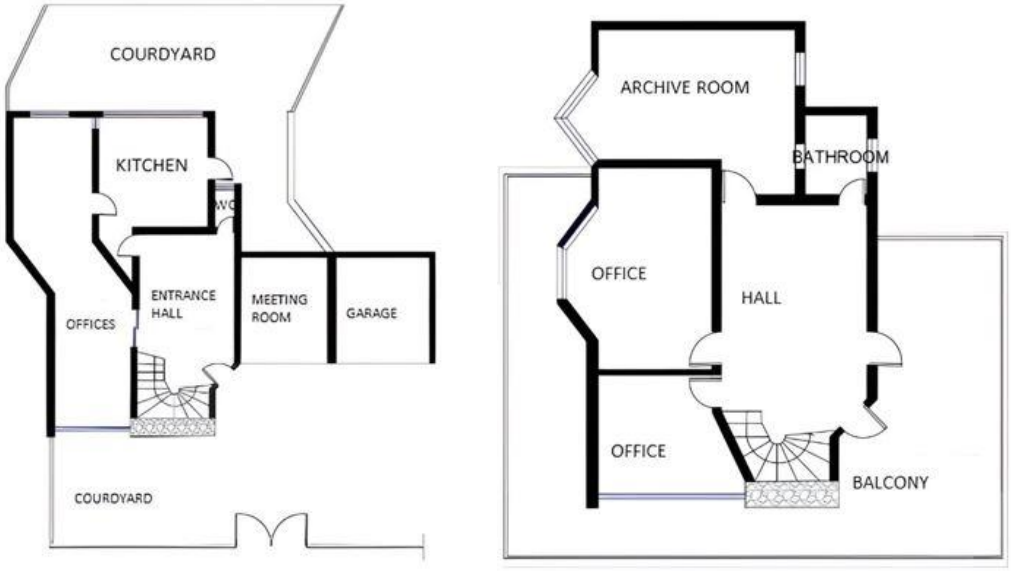
Structure plans make explicit reference to the modern architectural approach that has been investigated, the dynamic between full and empty spaces a Cubist principle, and basic geometric shapes. Additionally, similar to De Stijl, there are straight lines, simple forms of geometry split into parts, an 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.

Although 27 Efruz Houses still functioned as houses, four structures were given other uses while partially preserving some of their formal sustainability. An A-type structure that has been turned into an insurance company is the first of these houses. The planned architecture of this edifice has been maintained even though its function has changed. The living area has been converted into a conference room on

the bottom level of the building, which has had its interiors reorganized. The entrance area, kitchen, and guest restroom have all been left untouched. The small living space, which was formerly attached to the dining room, was also given a new function by becoming an office. Two of the bedrooms on the upper floor have served as offices and one as an archive room, while maintaining their bathroom functions. See Figure 14. The building hasn't undergone any formal changes, therefore it still carries the approaches of the modern period, such as functionalism, cubism, De Stijl, and Bauhaus.

Figure 14

Ground and first-floor plans of the A-type insurance building, which has not undergone form changes, (*Author, 2023).*

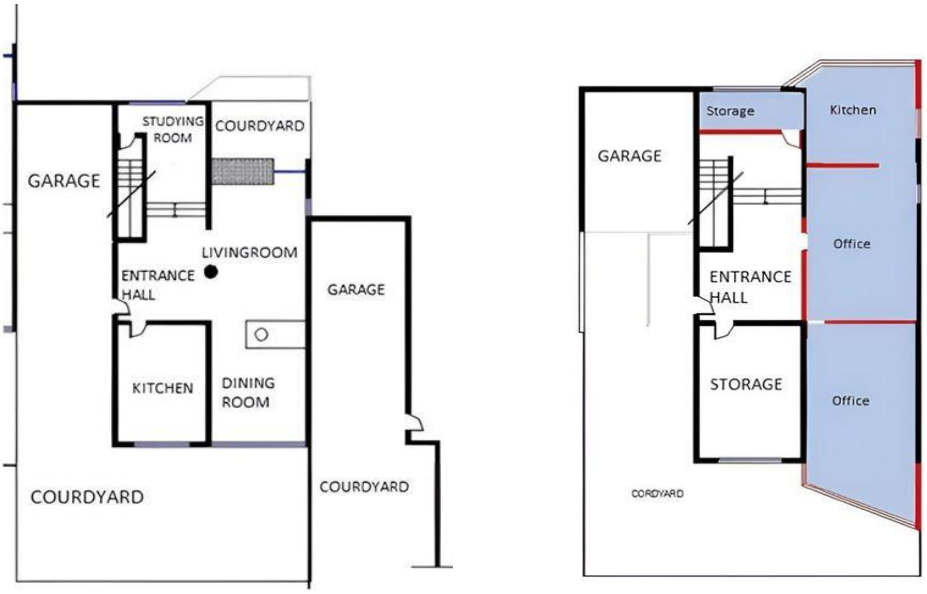


The E-type building, which serves as the human resources department for a private hotel, is the other structure whose function has altered. Both the structure's function and its original plan design have been altered. The ground level of the building's inner spaces has been re-functionalized, while the other areas underwent a functional modification. However, the entrance area and the guest restroom are still in use. A warehouse has been built in the former kitchen area on the right side of the entry hall. The rooms have been expanded to both the front and the back and are utilized as living spaces and dining rooms. Spaces organized according to an open-

plan layout, these rooms now serve three different purposes; the kitchen is located in the rear and two different offices are located in the front. On the bottom floor, there is a study area that was closed off and made into an office. On the upper floor, no changes to the plan were made. It has turned the bedrooms into workplaces. Figures 15 and 16's blue colouring designate the variations in the space building's ground floor plan. The functionalism, cubism, De Stijl, and Bauhaus elements that were approaches of the modern period were still present in Efruz houses. The building has survived to the present day by maintaining its sustainability because it has not undergone a significant modification in spite of the legal additions it has undergone.

Figure 15 (a, b)

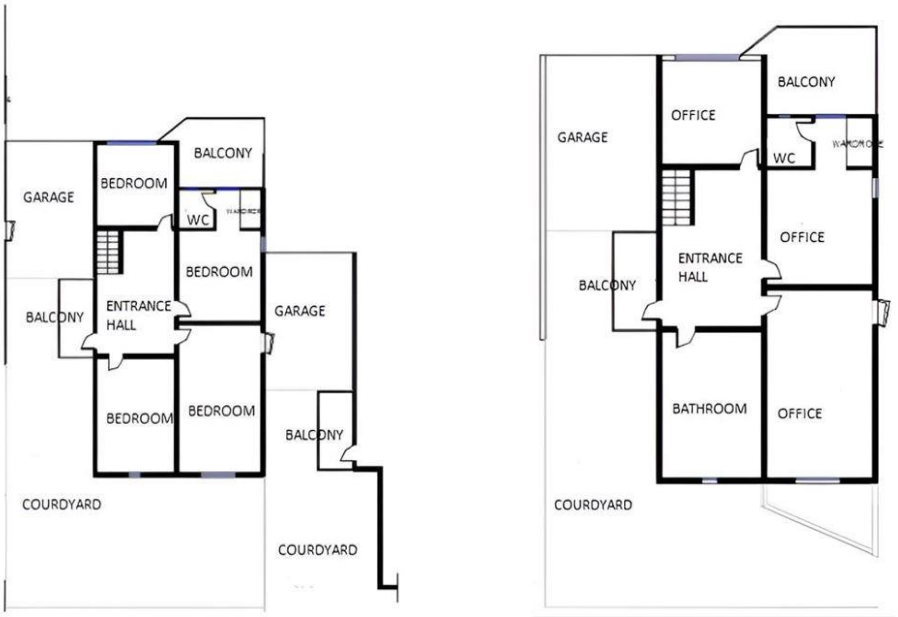
*The original (**a**) and changed function (**b**) plans of the E-type human resources office building, which has undergone a change in form on the ground floor plan,* (*Author, 2023).*



(a) **(b)**

Figure 16 (a, b)

*The original (**a**) and unmodified upper floor plans of the E-type human resources office building (**b**), (Author, 2023).*



(**a**) (**b**)

Another E-type Efruz House has undergone a functional change into an information technology office. With the additions to the original plan design, this building, whose function has altered, has undergone a formal change. The kitchen, guest restroom, open workplaces, and storage are located on the main floor of the structure, which has had its internal areas repurposed. The areas that were originally intended to serve as the living area and dining areas and were constructed with an open-concept style were expanded to both the front and the back. The design is split into three areas with the formal additions; the area in the back of the building is utilized as the warehouse, the area in the middle is utilized as an office, and the area in the front of the building is utilized as a warehouse. The area, which was planned as a study room on the ground floor, was functionally changed and converted into a warehouse after the functional shift. On the upper floor, no modifications to the plan were made. The areas that served as bedrooms to the upper floor design are now unoccupied because they serve no longer their original purpose. With the additions made to the front and back facades on the ground floor plan, the building has been changed by formal adjustments. Figures 17 and 18 are coloured blue to indicate formal space alterations in the building's ground floor design. The architectural style

has retained its modern period characteristics in spite of all the changes that have been made to the building form.

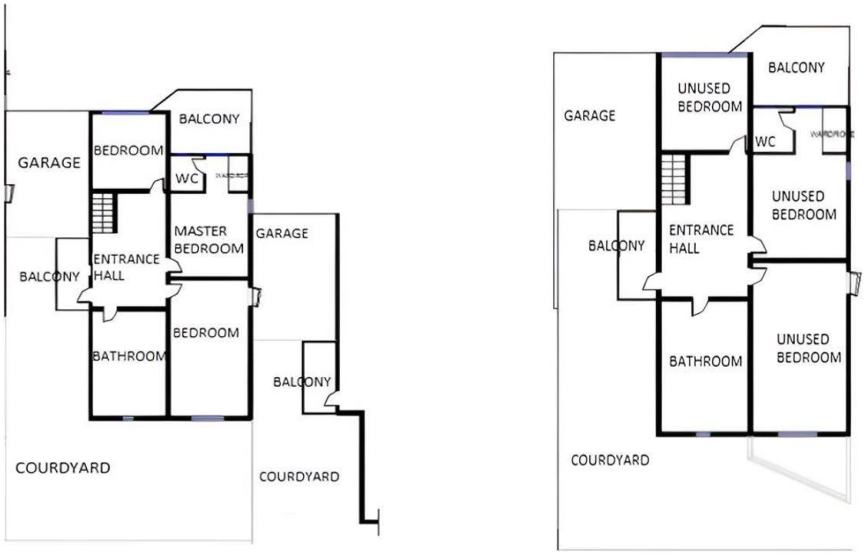
Figure 17 (a, b)

The original (a) and changed function (b) plans of the E-type information technology office building, which has undergone a change in form on the ground floor plan, (Author, 2023).

(**a**) (**b**)

Figure 18 (a, b)

*The original (**a**) and unmodified upper floor plans of the E-type information technology office building (**b**), (Author, 2023).*

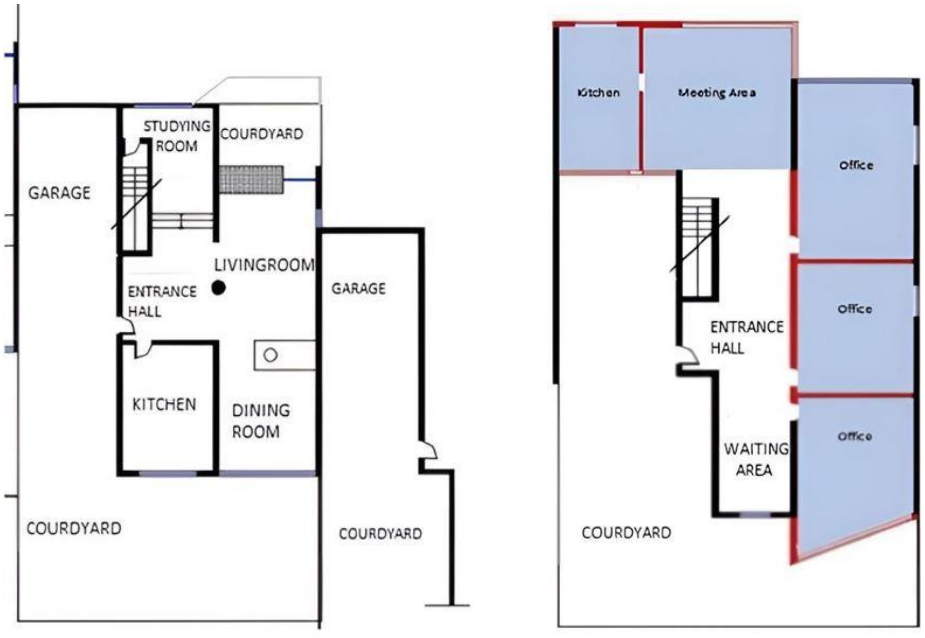


(**a**) (**b**)

In contrast, only the two rooms in the second-floor plan and all spaces within the bottom floor plan were altered in the other E-type building, whose function has changed as a private bank. The floor plans clearly show these changes. On the main floor plan, the living and eating areas were built as an open concept, but they have been split into three office spaces with distinct functions. Both the living and dining rooms were enlarged forward in the original structure plan. The kitchen that had been on the right side of the entry hall was relocated to the garage, it was extended toward the back and connected to the meeting space. The study area and living area on the main floor are used as offices and meeting areas after the functional change. Colouring in blue on Figures 19 and 20 denotes the space alterations in the building's ground and first floors. The building's original plan was lost as a result of these changes to the original design. All of the modifications to the building's form have been seen to partially alter its modern period approaches.

Figure 19 (a, b)

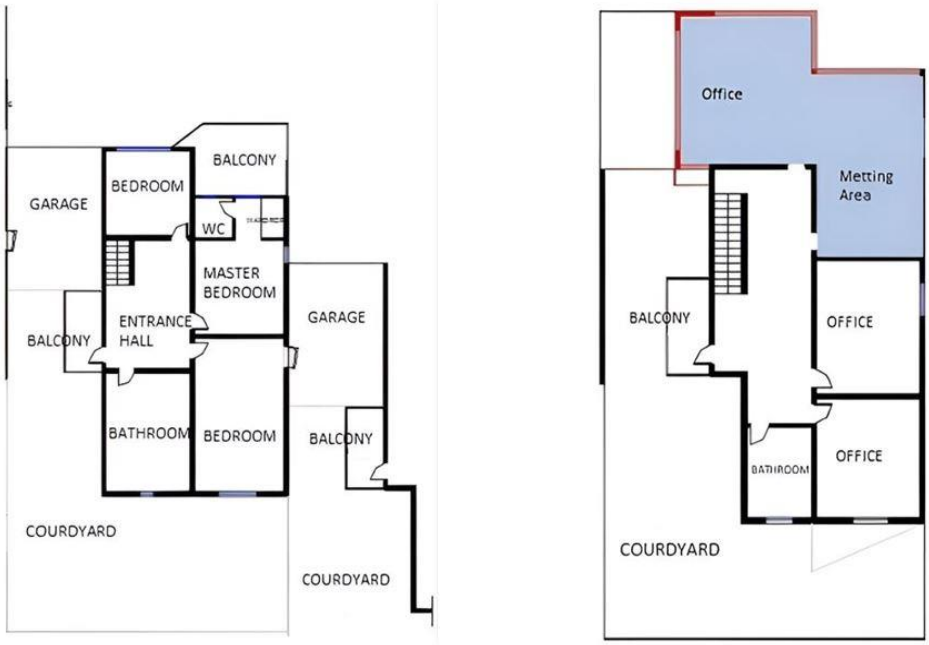
*The original (**a**) and changed function (**b**) plans of the E-type private bank which has undergone a change in form on the ground floor plan, (Author, 2023).*



(**a**) (**b**)

Figure 20 (a, b)

*The original (**a**) and changed function (**b**) plans of the E-type private bank which has undergone a change in form on the first-floor plan, (Author, 2023).*



(**a**) (**b**)

Within the context of the investigation, it was found that just one building in the block, which was categorized as type A, changed a function change. Efruz Houses were constructed during the modern era and underwent functional alterations during the design process. Preserving their formal form, buildings functioned. Contrary to the A-type construction, the three buildings classed as E-type received a great deal of formal context alterations, which led to a partial alteration of modern period approaches. In this situation, the buildings that have suffered an alteration in function also had their sustainability parameters partially altered.

Function

Ahmet Vural Behaeddin's Efruz Houses (Müdüroğlu Houses), which are made up of thirty-one rows of houses and were designed using contemporary materials from the time period, are still maintaining their sustainability. It is detected that only four homes have had their sustainability partially altered, according to research and observation.

There are 27 houses, that have the same function. Three are located on Tuncer Hasan Street, nineteen are located on Tuna Street, as well five are on Meriç Street, they remain in the same function as today. On Tuncer Hasan Street, Type A, one of the five homes that its function has altered, is situated. Although the function of this structure has changed, its original plan design has not been altered. On Meriç Street, there are three further E-type constructions that alter their functions. As a result of the examination, it has been shown that both of the structures, which are classified as being of type A and E, retain some of their sustainability based on the changes in function that they have undergone over time and modern approaches of the current day.

Construction

Efruz houses (Müdüroğlu Houses) were 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. The row buildings with two levels were built using tile roof construction technology. Through the garage area, the houses are connected to one another.

As in their plans, the facade designs of these houses include symmetrical and straight lines. The size of doors and windows varies depending on how they will be used inside, all while maintaining the facades' symmetry. Large windows and natural stone are employed to create movement on the facade surfaces. Additionally, the building's upper-level balconies' iron rails, which were built for both aesthetic and security reasons, are also significant elements of the facade design. It has seen obvious that the facade and floor plan design set up of these houses prioritize functionality.

The A-type structure, one of the four Efruz Houses which underwent functional alterations, lost its original function and was converted into an insurance company. The original exterior design for the insurance company has not undergone any structural changes, ensuring the continued sustainability of the modern period's approaches and criteria. The building has undergone just a functional change. The building's original materials have been retained, and the roof's eaves were repainted green as part of the design of the facade to represent the insurance agency's distinctive hue. See Figure 21.

Figure 21

Facade designs of the insurance agency, (Author, 2023).

Another building had its original facades substantially structurally altered when it was converted into the human resources office of an E-type hotel, losing its original function. These changes consisted of expanding the dining space toward the front facade and covering the terrace that faced the rear of the hall so that it was included in the main floor plan. The original building elements of the current structure were retained on the other facades. The exterior design of this repurposed structure has undergone structural and aesthetic changes, which have resulted in a partial loss of the modern period criteria and approaches throughout the row houses. See Figure 22.

Figure 22

Facade designs of the human resources office, (Author, 2023).

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The E-type structure, which houses a technology office, had structural alterations to its facades. The building's ground floor plan shows these changes. The building has lost its original identity as a result of the additions made to its front and back facades. The higher cover added to the original structure on the entrance door on the building's left side attracts notice. Examining the other facades revealed that the existing structure had kept its original construction materials. The building's original identity was lost as a result of the modifications, and the row houses' modern period criteria and approaches were somewhat partially lost. See Figure 23.

Figure 23

Facade designs of the information technology office, (Author, 2023).

Changes had been altered to the original facade designs of the otherwise E-type structure, which transformed its function to become a private bank. These changes result from extending the dining space toward the front and the chamber behind the stairwell toward the rear and merging them into the ground floor design. The ground-floor extension, which was added to the back facade, has been enlarged to match the top-story addition. Inside and out, the exterior's original facade materials had been changed. The original structure was harmed by the interventions made following the functional shift. As a result, Efruz Houses that were built using modern period criteria and approaches have lost their original identity. See Figure 24.

Figure 24

Facade designs of the private bank, (Author, 2023).

In the context of the thesis, it was found that the A-type structure retained its original identity and that two of the E-type buildings still had some of the modern period criteria and approaches when the construction of the five buildings that had a change in function was examined. In one E-type construction, it was found that the approaches had damaged the row houses' original structure from a sustainable perspective.

Analysis of the Sustainability Parameters of the Efruz Houses

In this part of the study focuses on Efruz Houses (Müdüroğlu Houses), which are assessed in terms of their cultural, social, environmental, and economic aspects all of which are sustainability parameters.

Social Sustainability

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."

Through the garage space, Efruz houses investigated as part of the study are related to one another to form rows of homes. These row homes are the ones that most accurately depict the criteria and approaches of architecture, which have become among the key characteristics of the modern period and are still relevant in terms of sustainability. These constructions meet criteria including density, walkability, community ties, and vehicle mobility when viewed in the circumstances of the social sustainability criterion.

The kind of A building, that was built in the modern period as a house and later converted into an insurance company, is carried in terms of its social sustainability because it is situated in a location with convenient access for both vehicles and foot traffic. In addition, it has social sustainability parameters with its population and traffic density, easy accessibility, neighbourhood relations, and social contribution to its environment. These characteristics allow it to maintain its social sustainability even today. The three E-type buildings underwent a functional overhaul to become offices for human resources, technology, and private banks. These buildings, just like Type A buildings, meet criteria such as simple accessibility, walkability and vehicle accessibility, neighbourhood relations, functionality, density and the social benefits they provide to the environment, so they maintain their social sustainability when their social sustainability is evaluated.

Cultural Sustainability

The Efruz Houses (Müdüroğlu Houses), which were designed in Northern Nicosia, Cyprus, during the modern period and adhere to its architectural design criteria, were constructed using both modern period materials and local materials.

Efruz Houses are buildings 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.

The A-type home structure still maintains its architectural and cultural sustainability because it has not undergone any modifications in the architectural building process, whereas the other four houses that change function are assessed in terms of both their architectural identities and cultural sustainability. The additions front and rear facades of the buildings have caused certain alterations when the architectural identity of the two E-type buildings is analysed from the perspective of cultural sustainability. Therefore, the modern period's primary criterion simple geometric forms, clean lines, and open-plan approaches have altered, and with it, cultural sustainability. In this context, the building has partially lost both its architectural and cultural identity and its architectural and cultural value. On the other hand, the other E-type building has undergone too many changes to both floor plans, which has prevented it from maintaining it is architectural and cultural sustainability with losing the criteria and approaches of the modern period. Like this way, the building has completely lost both its architectural and cultural identity and its architectural and cultural value.

Environmental Sustainability

Designed in Modern period Efruz Houses (Müdüroğlu Houses) were 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 these buildings. The new buildings constructed in close proximity to these rowhouse houses' immediate surroundings not conforming to modern approaches and criteria, snatch social neighbourhood ties.

The insurance company which is classified as type A, facade design, which is analysed in terms of environmental sustainability, had no alterations. The building has preserved its relationship with its surroundings in a functional context. Since the

building has not been subjected to any intervention or change, environmentally sensitive and environmentally friendly original construction materials have been preserved. The internal and external relationship setup is intact in the structure. As a result, even if its function has changed, the structure has kept the effects of the modern period from harming the environment.

The architectural approaches have affected the building, because of the design changes of the front and back facades, which have been altered as a result of the modifications made to the structure, which has now been converted into a human resources office. Therefore, environmental sustainability was also partially harmed because of the modern period's emphasis on simplicity, and the interaction between the inside and external has altered visually. Due to the interventions made in the building, the environmentally friendly and environmentally sensitive materials in the building were partially damaged. The building, whose internal and external relationship and functional relationship with its environment was partially damaged, also lost its contribution to the environment.

Along with changes to the original building structure, the Technology office building has undergone a functional change that includes the top cover design on the left facade entrance door. The rear facade has also undergone another renovation with the creation of a new area. As a result, it is evident that this building's environmental sustainability has changed to some extent as the visual order it generated among the other row houses has deteriorated. Environmentally friendly and environmentally sensitive construction materials have been partially damaged due to interventions in this structure whose function has changed. The building, whose internal and external relationship and functional relationship with its environment has been partially damaged, has also partially lost its contribution to the environment.

The building with the most significant spatial modifications is the E-type structure, which was recently transformed into a private bank. The visual ordering of the row houses was disturbed by extending the space of the left rear facade and extending the area on the right of the front facade forward. The modern period design principles and approaches of this structure were completely disregarded in the

adjustments made to all of its facades. With changes made to the structure throughout its function of functioning, the building's original identity was altered, and it was rebuilt using modern materials. Due to all these interventions and changes, the building has lost environmentally friendly materials. In addition, the building, whose functional relationship with its environment has been lost, has completely lost its internal and external relations and its contribution to the environment. So, has thereby altered the visual order of the rowhouses while also harming the building's environmental sustainability.

Economic Sustainability

Efruz Houses (Müdüroğlu Houses), which were constructed during the modern period, carry cultural value and kept their original function, continue to be economically viable due to their social and cultural significance. Current, modern materials were used in the construction of the houses. Due to their position, row houses are situated on the line of a tourist center having high land and property values. Because of this, they continue economically sustainable as well as environmentally sustainable.

The insurance office building, when considered in the context of the economic sustainability parameter, which was constructed with modern criteria and approaches, maintains its economic sustainability because it is economically and culturally significant by today's standards. The fact that the building is not subjected to any intervention contributes to economic sustainability due to the preservation of the current construction materials of the building. The building's real estate value rises because the functional improvement was done while maintaining the original construction criteria.

The extensions made to the front and back facade of the human resources office, which was re-functionalized by partially upholding modern period approaches and criteria, can be seen as partially changing the sustainability of the original facade design. The additions made to the building have compromised its original architectural identity and have, to some extent, caused deterioration in its construction materials. Consequently, these interventions have negatively impacted the economic sustainability of the structure. Furthermore, changes in functionality,

albeit with an attempt to retain some of the original construction criteria, have also diminished the real estate value of the building.

The additional structure built to the rear facade and the top coating that was added to the left side entrance door have altered the original building identity of the technology office. With these additions, the construction materials used in the original construction of the building were also damaged. Since functional changes were made in the building, where the original construction criteria were partially preserved, the economic sustainability of the building was also affected. The building's modern period approaches and criteria have changed as a result of this modification, which has also damaged its long-term economic viability.

Due to the substantial changes made to the structural form and materials, the private bank building, which was re-functionalized by disregarding the approaches and criteria of the modern period, has damaged its original building identity. Radical changes in the structure caused considerable damage to the original construction materials of the building. The building's economic sustainability was utterly damaged as a result of the drastic alterations.

Discussion

- ***The relationship between the architectural criteria and approaches of the modern period and the sustainability parameters in Efruz Houses (Müroğlu Houses) located in the North Nicosia Kumsal region?***

The study aims to analyse the current situation of Efruz row houses, which were selected and designed in the modern period in the Kumsal region of North 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.

The handling of modern period buildings as a whole with the concern of preservation was realized with a declaration published by DOCOMOMO (1990)

right after the Eindhoven Conference (Henket, H. & de Jonge, 1991). In their study, Polat and Can (2008) stated that DOCOMOMO expresses modern period buildings as works that have modern period design principles according to function, technique, and space, instead of ornament and decoration, ignoring historical references. In addition, institutions, organizations, and institutes such as the Office for the Evaluation of Federal Heritage buildings in Canada, English Heritage Parks in the UK, the National Parks Service in Canada and the USA, UNESCO, ICOMOS, Getty Institute, the Council of the European Union, mAAN such as the institutions, organizations, and institutes works to determine the criteria of modern period structures. Besides, it continues its studies for the preservation of modern architectural structures according to date ranges (Polat and Can (2008).

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 Kumsal area is considered in this context in the study, it has been clearly seen that although there are houses that have changed functional changes in Row Houses, they still carry both the criteria and approaches of modern architecture and the criteria of sustainability.

• ***The relationship between modern architecture and the concept of sustainability?***

Although the discipline of architecture always follows the up-to-date, it does not conflict with the concept of sustainability, and even the concept of sustainability, like architecture, is constantly updated. While the concept of sustainability is associated with architecture, it develops in the light of its past and makes architecture rich in terms of structure. The fact that sustainable architecture as a concept has become an important issue is due to the fact that it affects architecture in many ways. Accordingly, Vandevyvere and Heynen (2014) argue that Modernism and sustainability have much more in common than many current debates offer and that it should be examined from a broader perspective by embracing the legacy of modernism, accepting its continuity with the desire to modernize. They also argue

that "the convergence between the discourses of modernism and sustainability" and "sustainable modernism" can provide a good paradigm for developing architectural education and architectural culture.

- ***How is the relationship between modern architectural criteria and approaches and sustainability parameters defined?***

Architectural approaches, which reflect the understanding of design in architecture, are the set of concepts formed by characteristic and periodical features in the definition of buildings. The approaches that emerged in the modern period were influential in the development of modern architecture and reflecting the architectural criteria of the modern period. Today, it is possible to see that many buildings designed in the modern period have lost their criteria and approaches and cannot maintain their sustainability. In this context, it has been determined in the findings that when the modern period buildings change their function or are renewed, they will preserve the modern period identity when considered together with the criteria and approaches of the modern period, parameters of sustainability.

- ***Which of the modern architectural criteria and approaches do Efruz Houses have?***

With the modern period, Louis Sullivan's (Venturi, 2005) slogan, "form follows function," has become the basic principle of the period, emphasizing that buildings should be designed in accordance with their own nature and special conditions and allowing them to develop logically. Accordingly, Le Corbusier (Venturi, 2005), who said that "the operation of the plan happens from the inside out, it is the result of the external environment" supported Sullivan's words. In this context, the function, which is the determinant of the building forms, has been the most important criterion of the designs. Thus, houses designed with function, which is a defense of the modern period, should respond to the needs of the user, be designed by respecting the location and culture of the region where they are located, and a modern life should be fictioned. Although the approaches that emerged with the modern period offer different designs, they basically contain the same ideas and principles. It has emerged in research that many of the buildings designed with the

materials that emerged in the modern period and the technique of the period still survive even if they change their functions and are renewed in today's conditions.

Findings revealed that Efruz row houses were designed by taking these criteria into account. Although Efruz row houses contain four buildings that have lost their function, it is clearly seen that the identity of the period has lost its currency, especially since one of them did not remain faithful to the criteria, style, materials, and techniques of the period. The simplicity, open plan setup, sharp lines and geometric forms, which are the architectural criteria of the modern period, are clearly seen in the row houses, of which twenty-seven of the thirty-one row houses continue to function as residences. It has been clearly seen that they also carry the approaches of Functionalism, cubism, De-Stijl and Bauhaus, which are among the approaches of the modern period. In the four houses that have changed functional changes, one of them still bears the approaches and criteria of the period, since it did not interfere with the structure at all. However, with the additions they made to the plan design, the two of them partially lost the criteria of the modern period, but preserved the functionalism, Cubism, De Stijl and Bauhaus approaches, which are the styles of the modern period. Another one was determined in the findings that it lost both the criteria of the modern period and the approaches of the period with his interventions in the building.

- ***How does Efruz Houses relate to the social, cultural, environmental, and economic parameters of sustainability?***

While constructing structures that can be transferred to future generations, it is necessary to respect the natural environment and the time. Using the right design principles and natural resources, as well as taking advantage of the technology of the period, ensures the sustainability of the buildings until today. In this context, it is an important factor to consider and implement sustainability together with its social, cultural, environmental, and economic parameters. These findings confirm that Efruz Row Houses were built by fully utilizing the design principles of the modern period and the technological possibilities of the period.

It is supported by the results obtained from the reference of selected world examples and the findings of the study that the modern period residences designed in the Kumsal region of Nicosia have preserved their identity with a sustainable approach until today without losing their architectural criteria and approaches.

In this context, when row houses are considered with the social, cultural, environmental, and economic aspects of sustainability; based on observations, examinations, and collected data, it has been determined that thirty-one row houses maintain their social sustainability due to factors such as functionality, population density, accessibility, neighborly relations, and their contribution to the local community. In the context of cultural sustainability, it was found that twenty-seven of these houses have effectively preserved their architectural and cultural identity, architectural history, and cultural significance. Among the four row houses that underwent functional changes, one remained unchanged, two were partially preserved, and one lost its architectural and cultural identity completely.

From an environmental perspective, it was observed that the 27 houses whose functions remained unchanged do not disrupt the visual harmony of their surroundings. They maintain their functional and material connection with the environment and uphold their environmental sustainability by preserving both their interior and exterior structures. However, among the four houses that underwent functional changes, three partially compromised their environmental sustainability. These houses, while partially preserving the visual harmony and their functional and material relationship, made alterations to their facades through subsequent additions. One house completely lost its environmental sustainability as it underwent a complete transformation of its facade and structure through extensive building additions.

Among the twenty-seven row houses that have not changed their functions maintain their economic sustainability because they are economically and culturally important in today's standards and the original construction materials are preserved. The real estate value of these structures increases as the original construction criteria are preserved. One of the four houses that have economic sustainability and have changed functions maintains its economic sustainability because it does not interfere

with the structure at all and preserves the original identity of the building and its construction materials. However, it was determined in the findings that two of the three houses that had changed their functions could not maintain their economic sustainability because they were partially damaged by the interventions made on their materials and facades, and the other one did maintain completely changed the existing structure.

CHAPTER V
Conclusion and Recommendations

Conclusion

In many nations around the world today, in the century we now live in, the social, cultural, and environmental repercussions of architectural criteria and architectural approaches 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 thesis investigates the link between the impacts of altering living conditions such as swift urbanization, and socioeconomic dynamics in the modern period, and the understanding 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. Architectural constructions representing the traces in the modern period were designed in the 1960s and the 1970s, despite the negative factors such as war, the economy, and migration among the two communities on the island in 1960 and 1974. With the original designs, they built in various areas across the island, mostly houses structure, the architects of the time (Ahmed Vural Behaeddin, Abdullah Onar, Ayer Kaşif, etc.) created the architectural identity of the modern period.

Ahmed Vural Behaeddin, one of the architects who came to the island after completing his education abroad in the modern period, demonstrated a modern comprehension of life in his designs by incorporating functionality, an open free plan technique, simplicity, and integrity. In this context, it is clearly seen that the understanding of the modern period comes to the fore in the design of Efruz row houses by Behaeddin.

The houses built in different countries of the world in the modern period besides Efruz Row houses, are examined, it has been determined that even though some buildings have changed functional changes, they have preserved their structural identities until today without losing the criteria and approaches of the period.

In this study, Efruz rowhouses were chosen as a case study, and important information was provided on the study of modern period architectural criteria and approaches and sustainability parameters, and the evaluation of sustainability together with its parameters without ignoring modern architectural criteria and approaches. The field research has revealed the current status of the Efruz rowhouses, allowing for a comprehensive evaluation of the rowhouses.

Although twenty-seven of the row houses, consisting of a total of thirty-one houses, continue to function as houses, four houses have changed their functions. The four houses that have lost their function are examined with the criteria and approaches of the modern period, it is seen that a building that preserves its original identity still carries the criteria and approaches of the modern period. The other two houses have partially preserved the criteria and approaches of the house and have not made any changes in the original construction materials. Thus, these two function-changing houses continue the architectural criteria and approaches of the modern period. In another house, which was transformed into a private bank by changing its function, the original identity of the building was damaged by the interventions. The building has changed radical changes in the plan and the additions made to the facades have ignored the architectural criterion approaches of the modern period. In addition, with these interventions, the original construction materials reflecting the identity of the period were changed and the original identity of the building was ignored. In this context, one of the four houses that changed function preserved its modern period identity, while the other two partially preserved it. One of them has lost its original identity by completely ignoring the criteria and approaches of the modern period. Accordingly, it has been clearly seen that the modern period buildings designed and built in the Kumsal region of Nicosia, which did not change their function, could preserve the modern period architectural criteria and approaches until today.

In addition, Efruz Row Houses were discussed with their sustainability parameters (social, cultural, environmental, and economic). Accordingly, it has been determined that all of the thirty-one-row houses preserve their social sustainability, which is one of the parameters of sustainability. In the context of cultural and

environmental sustainability, it was revealed that the sustainability of twenty-seven houses whose function did not change continues, but one of the four residences that changed function preserves its cultural and environmental sustainability because it preserves its original identity. In two of the other three houses that have changed function, both their cultural sustainability and environmental sustainability have been partially preserved due to the partial intervention in the building. A house that has been converted into a private bank has completely lost its cultural and environmental sustainability, as it has damaged the original identity of the building. Land and real estate values are high due to the location of twenty-seven residences, which maintain their social, environmental, and cultural sustainability and whose functions do not change. In this context, they also maintain their economic sustainability. One of the four residences that changed their function remained economically sustainable as it did not undergo any changes other than functional changes. However, two of the three other function-changing houses partially lost their modern architectural criteria and approaches, and their economic sustainability was partially damaged. A residence, that has undergone a change in function and turned into a private bank, has lost its economic sustainability as it has completely changed the criteria and approaches of the modern period. Considering all these changes, analysis studies conducted with a holistic approach reveal the unique architectural identity of modern-period buildings and the importance and value of conservation and sustainability.

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. In this context, it has been observed that the criteria and approaches of the modern period can be completely preserved in the houses that did not change their function in Efruz houses.

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. Therefore, in this study, the importance of modern criteria and approaches has been revealed. As a result of the literature and analysis evaluations, it is thought that the sustainability context of the modern period architectural criteria and approaches of the study area will contribute to the scientific literature.

Recommendations

As for the conclusions of this study, the necessity to safeguard houses built during the modern architectural period has an inevitable outcome. Particularly, the interventions that the study area's structures were exposed to when they underwent functional change made the period's identity fade. In order to preserve the essence of Cyprus' modern architecture, it is crucial to ensure the continuity of urban development over the island using a comprehensive and sustainable approach. The investigations have shown that Modernism's understanding helped to create and develop the foundation of the idea of sustainability, which evolved after the modern period's criteria and approaches were established. Because of these reasons, it has to be crucial to maintain the criteria of the modern period for providing a sustainable design. The study examined, together with the modern architectural criteria and approaches sustainability parameters of Efruz (Müdüroğlu) row houses designed in the modern period, and it also investigated their current situation. According to this study, the principles of modern period buildings in the understanding of design are as follows:

- In the context of the neighborhood relationships, accessibility, and density, it coincided with the social sustainability parameters,
- Cultural sustainability parameters overlap with architectural identity, which is generated by architectural construction technique and architectural approach,

- Its environmentally friendly design approach in building design overlapped with environmental sustainability parameters,
- The use of sustainable and local materials applied in the building design and the real estate value of its immediate surroundings overlapped with the economic sustainability parameters, it has been clearly seen.

The importance of preserving the architectural heritage of the modern period and functioning together with the sustainability parameters has been suggested so that some rowhouses, whose function has changed in the process, can preserve their modern period identity without losing it. Since simply maintaining modern architectural criteria and approaches will be not sufficient to preserve the modern period identity, it is advised that building designs that are compatible with cultural, social, environmental, and economic sustainability parameters should be applied. Accordingly, It ought to be put into effect by incorporating modern period architectural criteria with the present day's modern sustainable designs.

Recommendations According to the Findings

The main reason for the houses designed in the modern period is that they are exposed to neglect for a long time, and the necessary historical importance and maintenance are not shown, thus losing their function. The result is the possibility of losing its cultural and historical values. In this context, the intervention of the state is required to prevent the loss of architectural criteria and approaches of houses with cultural value. The socioeconomic, cultural, and environmental values of the regions where the modern period houses are located are kept alive as long as the building identity of the region is preserved. The modern architecture criteria and approaches should be considered together with the parameters of sustainability. According to this;

- Preserving its function if possible,
- Ensuring the preservation of the criteria and approach of the houses that change their functions, without disturbing the identity of the building,
- If it is to be renewed, no change should be made in the criteria and approach,
- If possible, should be renewed with the materials of the period and traditional construction techniques.

Recommendations for Future Research

- Recommend is the field study should be considered together in the future modern period housing analysis, where the criteria and architectural approaches of the houses of the modern architectural period can be preserved together with the sustainability parameters.
- For future research, it is highly recommended to consider the research topic studied in the thesis in a broader context.
- Recommended to carry out document-based studies that deal with much more data and information about modern architects and structures in Northern Cyprus.
- Recommend is conduct a large-scale study by considering the modern period houses with historical and cultural value studied in the North Nicosia Kumsal region, in other cities of Northern Cyprus, even in the southern Nicosia region of Cyprus.
- Recommended, that the sustainability of modern period buildings be preserved throughout Cyprus.
- Recommend is all subjects, institutions, and organizations that supervise, implement, and manage the protection of modern structures should be developed and trained in the subjects of protection of modern structures.

REFERENCES

Acar, H. (2004). Konut tasarımında yeni kavramlar ve tek ev mimarisindeki biçimsel yansımaları (Doctoral dissertation, Fen Bilimleri Enstitüsü).

Ahmet, M. O. R., & dursun Çitçi, M. (2007). KKTC'de Kentleşme. Doğu Coğrafya Dergisi, 12(18), 225-245.

Akbulut, İ. (1998). Kuzey Kıbrıs: tarihi ve tarihi eserleri.

Akgül, U. (2010). Sürdürülebilir kalkınma: Uygulamalı antropolojinin eylem alanı. Antropoloji, (24), 133-164.

Akyildiz, N. A. (2020). The concept of space from the space-individual relationship perspective. Int J Innov Sci Res Technol, 5(2), 284-289.

Akyildiz, N. A. (2020). The concept of space from the space-individual relationship perspective. Int J Innov Sci Res Technol, 5(2), 284-289.

Akyol Altun, D. (2016). Brutalism now: rethinking Brutalism in contemporary world architecture. In *Arts* (Vol. 5, No. 2, p. 3). MDPI.

Alfirević, Đ., & Simonović-Alfirević, S. (2017). Brutalism in Serbian architecture: Style or necessity? *Facta universitatis-series: Architecture and Civil Engineering*, *15*(3), 317-331.

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.

Al-Najjar, S., & Al-Azhari, W. W. (2020). Brutalist Architecture in Jordan: Towards a Codifying Methodology.

Alsaç, Ü. (1997). "Bauhaus" maddesi, Eczacıbaşı Sanat Ansiklopedisi, I. Cilt, Yem Yayını, İstanbul

Amen, M.A. (2017). The inspiration of Bauhaus principles on the modern housing in Cyprus. J. Contemp. Urban Aff., 1, 21–32.

Apmann, B., S. (2022). Beyond the Village and Back: The Chrysler Building. Retrieved from: https://www.villagepreservation.org/2020/05/04/beyond-the-village-and-back-the-chrysler-building/ . Date of access: 08.04.2023.

Appendino, F. (2017). Balancing Heritage Conservation and Sustainable Development—The Case of Bordeaux. In IOP Conference Series: Materials Science and Engineering; IOP Publishing: Bristol, UK; Volume 245, p. 062002.

ArchDaily (2010). AD Classics: Fallingwater House/ Frank Lloyd Wright. Retrieved from: https://www.archdaily.com/60022/ad-classics-fallingwater-frank-lloyd-wright . Date of access: 05.03.2022.

ArchDaily, (2021). AD Classics: Villa Roche / Le Corbusier. Retrieved from: https://www.archdaily.com/151365/ad-classics-villa-roche-le-corbusier . Date of access: 18.07.2021.

ArchDaily, (2021). AD Classics: The Einstein Tower / Erich Mendelsohn. Retrieved from: https://www.archdaily.com/402033/ad-classics-the-einstein-tower-erich-mendelsohn . Date of access: 30.07.2021.

ArchDaily, (2021). AD Classics: Solomon R. Guggenheim Museum / Frank Lloyd Wright. Retrieved from: https://www.archdaily.com/60392/ad-classics-solomon-r-guggenheim-museum-frank-lloyd-wright . Date of access: 30.07.2021.

ArchDaily, (2021). AD Classics: Ronchamp / Le Corbusier. Retrieved from: https://www.archdaily.com/84988/ad-classics-ronchamp-le-corbusier . Date of access: 30.07.2021.

ArchDaily, (2022). AD Classics: Dessau Bauhaus / Walter Gropius. Retrieved from: https://www.archdaily.com/87728/ad-classics-dessau-bauhaus-walter-gropius. Date of access: 07.09.2022.

Architecture Chicago Plus. (2013). Apotheosis of the Skyscraper: The Rise of Mies van der Rohe's IBM Building. Retrieved from: http://arcchicago.blogspot.com/2013/05/apotheosis-of-skyscraper-rise-of-mies.html . Date of access: 08.04.2023.

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.

Argan, Giulio Carlo: (1992). Arte Moderna, São Paulo, Companhia das Letras.

Arkitektuel, (2021). TWA Terminali. Retrieved from: https://www.arkitektuel.com/twa-terminali/ . Date of access: 30.07.2021.

Arkitektuel, (2021). Rietveld Schröder Evi. Retrieved from: https://www.arkitektuel.com/rietveld-schroder-evi/ . Date of access: 01.09.2021.

Arkitektuel, (2023). Centre Pompidou. Retrieved from: https://www.arkitektuel.com/centre-pompidou/ . Date of access: 22.04.2023.

Architecht Zone. (2018). Frank Lloyd Wright, the Willits House and the Traditional Japanese Architecture. Retrieved from: https://architects.zone/frank-lloyd-wright-the-willits-house-traditional-japanese-architecture/ . Date of access: 17.08.2021.

Archeetect (2023). Gropius House by Walter Gropius | Architecture & Analysis. Retrieved from: https://archeetect.com/gropius-house/?utm_content=cmp-true#google_vignette . Date of access: 05.07.2023.

Architectuul (2023). Boston City Hall. Retrieved from: https://architectuul.com/architecture/boston-city-hall . Date of access: 19.02.2023.

Architectuul (2023). Steiner House. Retrieved from: https://architectuul.com/architecture/steiner-house . Date of access: 20.06.2023.

Architectuul (2023). Massachusetts, United States of America Walter Gropius. Retrieved from: https://architectuul.com/architecture/gropius-house . Date of access: 05.07.2023.

Asim, F., & Shree, V. (2018). A Century of Futurist Architecture: From Theory to Reality.

Atlas (2022). Atlas. Atlas of Places. Mies van der Rohe Neue Nationalgalerie. Retrieved from: https://www.atlasofplaces.com/architecture/neue-nationalgalerie/ . Date of access: 12.04.2022.

Atlas, (2017). Ferdinand Dutert Galérie des Machines 1889. Retrieved from: https://www.atlasofplaces.com/architecture/galerie-des-machines/ . Date of access: 15.07.2021.

Azizi, B.; Eshaq Zai, A. (2022). Explorıng the Characterıstıcs of Modernısm and Post-Modernısm: A Revıew Paper. J. Crıtıcal Rev., 9, 9.

BAĞCE, H. E. (2021). Modernliğin İkircikli Serüveni.

Baghchesaraei, A., & Baghchesaraei, O. R. (2015). Space definition in modern and innovative houses. Indian Journal of Fundamental and Applied Life Sciences, 5(S2), 266-269.

Bakshi, A. (2014). Urban form and memory discourses: Spatial practices in contested cities. J. Urban Des., 19, 189–210.

Bandarin, F.; Van Oers, R. (2012). The Historic Urban Landscape: Managing Heritage in an Urban Century; John Wiley & Sons: Oxford, UK.

Banham, R. (1996). *A critic writes: essays by Reyner Banham*. Univ of California Press.

Barzinji, M. N. H. (2013). Modernism, modernity and modernisation. *Modernism, Modernity*, *3*(12).

Basiago, A.D. (1998). Economic, social, and environmental sustainability in development theory and urban planning practice. Environmentalist, 19, 145–161.

Batur, E. (2009). Modernizmin Serüveni (8. Baskı). *İstanbul: Alkım Yayınevi*.

Baumgärtner, S., & Quaas, M. (2010). What is sustainability economics? Ecological Economics, 69(3), 445-450.

Bay, T. (2017). Phong cách De Stijl thể hiện đường lối cách tân chú trọng yếu tố màu sắc. Retrieved from: https://www.thietkekhachsan.vn/tin-tuc/articleid/3028/phong-cach-de-stijl-the-hien-duong-loi-cach-tan-chu-trong-yeu-to-mau-sac . Date of access: 01.09.2021.

Bazin, G., & Tarihi, S. (1998). Sosyal Yayınlar. İstanbul, Şubat.

Behne, A. (1996). The Modern Functional Building; Getty Research Institute: Los Angeles, VA, USA.

Bektaş, E. H. E. (2022). Modern Mimarlığın Beş İlkesinin Konut Biçimlenişleri Üzerinden İncelenmesi. *bab Journal of FSMVU Faculty of Architecture and Design*, *3*(2), 155-172.

Benian, E. (2010). Modern Mimaride İç-Dış İlişkisi Üzerine Bir Değerlendirme. Yayınlanmamış Doktora Tezi, Trakya Üniversitesi, Fen Bilimleri Enstitüsü, Edirne.

Berardi, U. (2015). Sustainability assessments of buildings, communities, and cities. In Assessing and Measuring Environmental Impact and Sustainability; Butterworth-Heinemann: Oxford, UK, pp. 497–545.

Bernardi, E.; Carlucci, S.; Cornaro, C.; Bohne, R.A. (2017). An Analysis of the Most Adopted Rating Systems for Assessing the Environmental Impact of Buildings. Sustainability, 9, 1226.

Brannigan, M., A. (2022). Runner Been Tours, Casa Milà Or Casa Batlló: Which Gaudí House Is Better. Retrieved from: https://runnerbeantours.com/casa-mila-or-casa-batllo-which-gaudi-house-to-visit/ . Date of access: 20.06.2023.

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.

Beth (2011). Hammer Sickle Architectural Fantasy. Retrieved from: http://b-hayden1114-dc.blogspot.com/2011/11/iakov-chernikhov.html . Date of access: 08.04.2023.

Bianchini, R. (2023). Le Corbusier, Villa Savoye, Part 2, Architecture. Retrieved from: https://www.inexhibit.com/case-studies/le-corbusier-villa-savoye-part-2-architecture/ . Date of access: 05.03.2022.

Biçer, K. (2006). Modernizm ve endüstriyel devrim ışığında çağdaş tasarımın temeli (Master's thesis, [yy]).

Birol, G. (1996). 19. yüzyıl endüstri devrimi sonrası mimari akımlar (Master's thesis, Balıkesir Üniversitesi Fen Bilimleri Enstitüsü).

Birol, G. (2006). Modern mimarlığın ortaya çıkışı ve gelişimi. *Megaron, Mimarlar Odası Balıkesir Şubesi Dergisi*, 3-16.

Block, I. (2018). Dezeen, Stijn Poelstra photographs Mondrian-esque elements of the Rietveld Schröder House. Retrieved from: https://www.dezeen.com/2018/08/29/stijn-poelstra-photographs-mondrian-rietveld-schroder-house-architecture/ . Date of access: 21.06.2023.

Blotkamp, C. (2001). Mondrian: The Art of Destruction; Reaktion Books: London, UK.

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.

Bourdeau, L. (1999). National Report: Sustainable development and future of construction in France. France: Centre Scıentıfique Et Technıque Du Bâtıment.

Britannica (2023). Fallingwater House. Retrieved from: https://www.britannica.com/place/Fallingwater Date of access: 05.03.2022.

Brownell, B. (2016). Getting inside Philip Johnson's Head at the Galss House. Retrieved from: https://www.architectmagazine.com/technology/getting-inside-philip-johnsons-head-at-the-glass-house_o . Date of access: 12.04.2022.

Buchard, B. (2021). Cereal, Architecture The Goetheanum A Rendering of Ideals. Retrieved from: https://readcereal.com/the-goetheanum/ . Date of access: 30.07.2021.

Budak, C. (1985). Sunuş: Modern mimarlığın kavramları üzerine. *Mimarlık Dergisi*, *23*, 17-23.

Bulat, S., Bulat, M., & AYDIN, B. (2014). Bauhause tasarım okulu. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *18*(1), 105-120.

Burdick, R. (2012). Behance, villa la roche / le Corbusier. Retrieved from: https://www.behance.net/gallery/3585259/villa-la-roche-le-corbusier . Date of access: 18.07.2021.

Brussat, D. (2017). Architecture Here and There, Crystal Palace of the mods. Retrieved from: https://architecturehereandthere.com/2017/07/29/crystal-palace-modernists/ . Date of access: 15.07.2021.

Campbell, L., Chiesa, A., Chung, J., Conlogue, C., Cordeiro, M., El Sydabi, W., & Temprano, A. (2014). The Farnsworth House: Mies van der Rohe.

Canan, F. (2003). Sürdürülebilir Bir Mimarlığa Doğru. Yapı Dergi si, (256).

Canoğlu Kocaman, S. (2019). Haluk Baysal-Melih Birsel mimarlık pratiğinin modern mimarlık mirası kapsamında değerlendirilmesi-Hukukçular Sitesi örneği (Master's thesis, Mimar Sinan Güzel Sanatlar Üniversitesi).

Caulfield, J. (2022). The Ward W. Willits House. Retrieved from: https://www.caulfieldphoto.com/gallery.html?gallery=The%20Ward%20W.%20Willits%20House%20-%201902&sortNumber=2&skipno=0#2 . Date of access: 23.02.2021.

Cevizci, A. (1999). Felsefe Sözlüğü, İstanbul: Paradigma Yayınları, 3.

Cevizci, A. (2005). Felsefe Sözlüğü, Istanbul: Paradigma Yayıncılık.

Cevizci, A. (2002). Felsefe Sözlüğü, İstanbul: Paradigma.

Chan, E., & Lee, G. K. (2008). Critical factors for improving social sustainability of urban renewal projects. *Social indicators research*, *85*, 243-256.

Cheney, J. (2023). Uncovering New York, Touring Frank Lloyd Wright's Martin House in Buffalo. Retrieved from: https://uncoveringnewyork.com/martin-house-buffalo/ . Date of access: 13.07.2023.

Ching, F. D. (2023). Architecture: Form, space, and order. John Wiley & Sons.

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.

Chicago Architecture Center. (2023). Crown Hall. Retrieved from: https://www.architecture.org/learn/resources/buildings-of-chicago/building/crown-hall/ . Date of access: 13.03.2023.

Cogaloglu, M.; Turkan, Z. (2019). Plan organization in XX. Century housing architecture in North Cyprus. Amazon. Investig, 8, 381–388.

Conrads, U. (1991). 20. Yüzyıl Mimarisinde Program ve Manifestolar. Ankara: Şevki Vanlı Mimarlık Vakfı Yayınları.

Conrads, U. (1971). Programs and Manifestos on 20th-Century Architecture; MIT: Cambridge, MA, USA.

Cottington, D. (2004). Cubism and Its Histories; Manchester University Press: Manchester, UK.

Courland, R. (2011). Concrete planet: the strange and fascinating story of the world's most common man-made material. Rowman & Littlefield.

Craven, J. (2018). About the Sydney Opera House. Retrieved from: https://www.thoughtco.com/sydney-opera-house-architecture-jorn-utzon-178451 . Date of access: 18.06.2022.

Creager, E. (2023). Colombus Monthly, Appalachian Travel: Frank Lloyd Wright's Iconic Fallingwater Comes Alive in Spring. Retrieved from: https://www.columbusmonthly.com/story/lifestyle/around-town/2023/04/17/appalachian-travel-frank-lloyd-wright-iconic-fallingwater-home-pennsylvania-embraces-nature/70122168007/ . Date of access: 02.07.2023.

Cresswell, P. (2008). Avery Coonley House - Frank Lloyd Wright, 1907. Retrieved from: http://pc.blogspot.com/2008/10/avery-coonley-house-frank-lloyd-wright.html . Date of access: 12.05.2021.

Crook, L. (2019). Dezeen, The Lloyd's building is Richard Rogers' first high-tech office block. Retrieved from: https://www.dezeen.com/2019/11/19/lloyds-building-richard-rogers-high-tech-london/ . Date of access: 22.04.2023.

Curtis, W. J., & Curtis, W. J. (1996). Modern architecture since 1900.

Dahlin, K. C. (2018). *The Aesthetics of Frank Lloyd Wright's Organic Architecture: Hegel, Japanese Art, and Modernism*. The University of Wisconsin-Milwaukee.

Demirel Etli, P. (2013). Sürdürülebilir mimarlık kapsamında mimarlık ofislerinde ışığın tasarımdaki rolü ve önemi (Master's thesis, Anadolu Üniversitesi).

Demirkaya, H. (1999). Mekân kavramının tarihsel süreç içindeki incelenmesi ve günümüzde mekân anlayışı., pp.27

Dempsey, N.; Bramley, G.; Power, S.; Brown, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. Sustain. Dev. 19, 289–300.

Diamond, B. (2011). Landscape Cubism: Parks that break the pictorial frame. J. Landsc. Archit., 6, 20–33.

Doğu, F.U.; Aras, L. (2019). Measuring social sustainability with the developed MCSA model: Güzelyurt case. Sustainability, 11, 2503.

Doordan, D. P. (2001). Twentieth-century architecture. (No Title).

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). Modern sonrası mimarlık anlayışları. *Mimarlık dergisi*, *263*, 46-50.

Dostoğlu, S. (1984). Modern Mimarlığın Ötesi. Mimarlık, S, 6.

DPÖ (Devlet Planlama Örgütü). (2011). Accessed on 21 June 2023. http://www.devplan.org/Frame-tr.html

Duman, Ü.; Asilsoy, B. (2022). Developing an Evidence-Based Framework of Universal Design in the Context of Sustainable Urban Planning in Northern Nicosia. Sustainability, 14

Duran, B. (2018). *Sürüdürülebilirlik kavramının önemi karşılaşılan sorunlar ve şirketlerin sürdürülebilirlik raporlarının incelenmesi* (Master's thesis, Başkent Üniversitesi Sosyal Bilimler Enstitüsü).

Dursun, P. (2009). Architects are talking about space. In 7th International Space Syntax Symposium. Stockholm: School of Architecture and the Built Environment.

Eizenberg, E.; Jabareen, Y. (2017). Social sustainability: A new conceptual framework. Sustainability, 9, 68.

Eliel, C. S., Ducros, F., & Gronberg, T. (2001). L'Esprit Nouveau: Purism in Paris, 1918-1925. *(No Title)*

Elkady, M., & Goubran, S. (2022). The Sustainability of Egyptian Modern Architecture. In IOP Conference Series: Earth and Environmental Science (Vol. 1026, No. 1, p. 012046). IOP Publishing.

Elkady, M., & Goubran, S. (2022). The Sustainability of Egyptian Modern Architecture. In IOP Conference Series: Earth and Environmental Science (Vol. 1026, No. 1, p. 012046). IOP Publishing.

Emmanuel Arenibafo, F. (2017). The Transformation of Aesthetics in Architecture from Traditional to Modern Architecture: A case study of the Yoruba (southwestern) region of Nigeria. *Journal of Contemporary Urban Affairs*, *1*(1), 35-44.

Erdem, D., Yanmaz, M., Ertem, M. E., & Karakaya, G. B. (2004). Sürdürülebilir Kalkinma Ve Demir Çelik Sektörü.

Erenler, E. (1997). Pürizm. *Eczacıbaşı Sanat Ansiklopedisi*, *3*.

Erk, G. K., & Uluoğlu, B. (2013). Changing Paradigms in Space Theories: Recapturing 20th Century Architectural History. International Journal of Architectural Research: ArchNet-IJAR, 7(1), 6-20.

Eş, A. (2008). Sustainability and Measuring Sustainability Performances of Companies. *Unpublished Master Thesis, Bolu: Abant Izzet Baysal University Institute of Social Sciences*.

Eyüce, A. (2011). Modernlik ve Türkiye'de Modern Mimarlık. Mimarlık Dergisi, 361, 58-60.

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). İki Mimarın Bir Öyküsü, 19600lardan Günümüz; I˛sık Kitabevi: Lefkoşa, Cyprus.

Fiksel, J.R.; Eason, T.; Frederickson, H. A (2012). Framework for Sustainability ˙Indicators at EPA; National Risk Management Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency: Research Triangle Park, NC, USA.

Forgacs, E. (2017). Bauhaus 1919-1933. *Çev. Alp Tümertekin. İstanbul: Janus Yayıncılık*.

Foucault, M., & Miskowiec, J. (1986). Of other spaces. diacritics, 16(1), 22-27.

Frampton, K. (2007). Modern Architecture–a critical History–revised and enlarged Edition.

Frampton, K. (2020). *Modern architecture: a critical history (world of art)*. Thames & Hudson.

Frampton, K. (2007). The Evolution of 20th Century Architecture: A Synoptic Account; Springer: New York, NY, USA.

Frisby, D. (2004). Analyzing modernity. In Tracing Modernity Manifestations of the Modern in Architecture and the City; Hvattum, M., Hermansen, C., Eds.; Psychology Press: London, UK, pp. 3–22.

Fuller, P. (1988). Theoria: art and the absence of grace (London, Chatto & Windus). *FullerTheoria: art and the absence of grace1988*.

Fuller, B. (2008). Utopia or oblivion: The prospects for Humanity (1969).

Fuller, R. B. (2009). *Ideas and integrities: A spontaneous autobiographical disclosure*. Estate of R. Buckminster Fuller.

Galenson, D. M. (2001). Painting Outside the Lines: Patterns of Creativity in Modern Art; Harvard University Press: Cambridge, MA, USA, p. 14.

Gardiner, S. (1985). Le Corbusier; AFA Yayınları: ˙Istanbul, Turkey.

Gardini, A. (2014). *The legacy of Antonio Sant'elia: An analysis of Sant'elia's posthumous role in the development of Italian Futurism during the Fascist era*. San Jose State University

Ghahramanpouri, A.; Lamit, H.; Sedaghatnia, S. (2013). Urban social sustainability trends in research literature. Asian Soc. Sci., 9, 185.

Gherardini, S. C., & Olmo, C. (2015). La Villa Savoye after Le Corbusier, une Longue Histoire. Docomomo Journal, (53), 40-47.

Gibson, E. (2016). Le Corbusier's Villa Savoye encapsulates the Modernist style. Retrieved from: https://www.dezeen.com/2016/07/31/villa-savoye-le-corbusier-poissy-france-modernist-style-unesco-world-heritage/ . Date of access: 05.03.2022.

Giedion, S. (1971). Architecture and the phenomena of transition: the three space conceptions in architecture. Harvard University Press pp.5,

Giedion, S. (1971). Architecture and the phenomena of transition: the three space conceptions in architecture. Harvard University Press pp.86,

Gieselmann, R. (1996). Mimaride üslup arayışı, Yapı'dan Seçmeler 8, Mimari Akımlar 1, 9-21. *Çev. Gülsen, Ö., YEM Yayın, İstanbul.*

Goodwin, D. (2020). Arcdaily, Alison and Peter Smithson: The Duo that Led British Brutalism. Retrieved from: https://www.archdaily.com/645128/spotlight-alison-and-peter-smithson . Date of access: 19.02.2023.

Google Earth (2023). Google Earth. Recovered from: https://earth.google.com/web/search/KUMSAL+NICOSIA/@35.19127895,33.35036865,137.58405362a,1858.2314533d,35y,0h,45t,0r/data=CnkaTxJJCiUweDE0ZGUxNzMzNmYxMzY2OTc6MHhiMDgyNzUyMmUzMjFhNGRmGQRsrGmDmEFAIa671GO2rEBAKg5LVU1TQUwgTklDT1NJQRgCIAEiJgokCXkCuWjXTTRAEXkCuWjXTTTAGUCYc6c3aypAIXiHcuBrKVbAKAI . Date of access: 07.01.2023.

Goryunov, V., Goryunova, S., Murgul, V., & Vatin, N. (2015). The Liberty Style-Italian Art Nouveau Architecture. *Advanced Materials Research*, *1065*, 2681-2685.

Great Buildings, (2021). Schröder House. Retrieved from: http://www.greatbuildings.com/buildings/Schroder_House.html . Date of access: 01.09.2021.

Great Buildings, (2021). Coonley House. Retrieved from: http://www.greatbuildings.com/buildings/Coonley_House.html . Date of access: 12.05.2021.

Griffith Winton, A. (2000). The Bauhaus, 1919–1933. *Heibrunn Timeline of Art History. New York: The Metropolitan Museum of Art*.

Gropius, W. (2002). Walter Gropius ve Bauhaus. Boyut Yayın Grubu.

Günçe, K.; Mısırlısoy, D. (2019). Assessment of adaptive reuse practices through user experiences: Traditional houses in the walled city of Nicosia. Sustainability, 11, 540.

Gündoğdu, E. (2002). Mimarlıkta Mekan ve Zaman (Doctoral dissertation, Yüksek Lisans Tezi, Gazi Üniversitesi Fen Bilimleri Enstitüsü, Ankara.

Gür, Ş. Ö. (1996). Mekan örgütlenmesi. Gür Yayıncılık.

Gürer, T. K. (1995). Mimarlıkta Söylemin Temsili Belirlemesi Ve İki Yirminci Yüzyıl Örneği: Pürizm Ve Neo-plastisizm (Doctoral dissertation, Fen Bilimleri Enstitüsü).

Guy, S., & Farmer, G. (2001). Reinterpreting sustainable architecture: the place of technology. Journal of Architectural Education, 54(3), 140-148.

Haftmann, W. (1960). Painting in the Twentieth Century; Lund Humphries: London, UK, Volume 1.

Hardy, A. (2011). The expression of movement in architecture. *The Journal of Architecture*, *16*(4), 471-497.

Harlow, J., Golub, A., & Allenby, B. (2013). A review of utopian themes in sustainable development discourse. Sustainable Development, 21(4), 270-280.

Hasol, D. (1993). Ansiklopedik Mimarlil Sözlüğü. Yapı-endüstri merkezi yay.

Hasol, D. (2014). Ansiklopedik Mimarlık Sözlüğü (12 b.). *İstanbul: YEM,*

Hasol, D. (2014). Ansiklopedik Mimarlık Sözlüğü (13. Baskı). İstanbul: Yem Yayın.

Hawkes, J. (2001). *The fourth pillar of sustainability: Culture's essential role in public planning*. Common Ground.

Hawkes, J. (2005). Culture as a fourth pillar of sustainability. Common Ground, Melbourne.

Heinberg, R.; Lerch, D. (2010). What is sustainability. Post Carbon Read., 11, 19.

Heinz, A., T. (2010). AD Classics: Frederick C. Robie House / Frank Lloyd Wright. Retrieved from: https://www.archdaily.com/photographer/thomas-a-heinz-corbis?ad_name=project-specs&ad_medium=single . Date of access: 22.06.2021.

Heinz, A. T., Corbis. (2010). AD Classics: Frederick C. Robie House / Frank Lloyd Wright. Retrieved from: https://www.archdaily.com/60246/ad-classics-frederick-c-robie-house-frank-lloyd-wright . Date of access: 13.09.2022.

Henket, H. A. J., & de Jonge, W. (1991). DOCOMOMO: First International Conference, September 12-15, 1990, Eindhoven.

Hillier, B. (1996). A configurational theory of architecture

Hitchcock, H. R., & Johnson, P. (1995). *The international style*. WW Norton & Company.,

Holdren, T. A. (2016). Re-Application of Neo-Plasticism: De Stijl Architecture in a Contemporary Context.

Iconıchouses.org (2022). Iconic Houses in The Netherlands - Rietveld Schröder House. Retrieved from: https://www.iconichouses.org/news/iconic-houses-in-the-netherlands-rietveld-schroder . Date of access: 08.04.2023.

Imani, E., & Imani, S. (2021). Brutalism: as a preferred style for institutional buildings in modern architecture period. In *E3S Web of Conferences* (Vol. 231, p. 04001). EDP Sciences.

İnceoğlu, M., & İnceoğlu, N. (2004). Mimarlıkta söylem, kuram ve uygulama. Tasarım yayın grubu, İstanbul.

Irak, M. (2008). *Çağdaş resim sanatında soyut dışavurumculuğun anlamı ve etkileri* (Master's thesis, [yy]).

Irmak, Ö. D. (2008). Antik dönemden günümüze mimari mekan arayışı; Behruz Çinici ve Şevki Vanlı eserlerinin mekanı algılamasını sağlayan ögeler açısından irdelenmesi

Irving, M., & St John, P. (2007). 1001 buildings you must see before you die. (No Title).

İzgi, U. (1999). Mimarlıkta süreç: kavramlar, ilişkiler. YEM Yayın, Yapı-Endüstri Merkezi Yayınları.

Jeronen, E. (2020). Economic Sustainability. In Encyclopedia of Sustainable Management; Idowu, S., Schmidpeter, R., Capaldi, N., Zu, L., Del Baldo, M., Abreu, R., Eds.; Springer: Cham, Switzerland.

Karaca, A. (2021). A review of architectural periods and comparing with today's architecture. *International Journal of Development Research*, *11*(01), 43835-43838.

Kaya, B. (2005). Hareket kavramının modern mimariye etkileri üstüne bir araştırma pp:23.

Keskinalemdar, H. (2011). *Ekspresyonizm Kavramı Ve Mimarlıkta Ekspresyonizm İn Frank Gehry Bağlamında İncelenmesi* (Doctoral dissertation, Fen Bilimleri Enstitüsü).

Khan, H. U. (1998). International style: Architektur der Moderne von 1925 bis 1965. Taschen.

Kırcı, N. (2013). 20. Yüzyıl Mimarlığı. Nobel Yayın Dağıtım, Ankara.pp.176.

Kim, T. (2005). MIT: Comparisons to Sant'Elia's Citta Nuova. Retrieved from: https://web.stanford.edu/~kimth/www-mit/mas110/paper1/ . Date of access: 08.04.2023.

Kortan, E. (1986). *XX. yüzyıl mimarlığına estetik açıdan bakış*.

Kortan, E. (2000). Yeni Yüzyılda Mimarlık. Yapı Dergisi, 222, 71-84.

Kortan, E., (1996c), “Ekspresyonist Mimarlıkta Tasarım Süreci”, Mimari Akımlar I, Yapı’dan Seçmeler 8, YEM Yayını, İstanbul, s.64-75.

Krausse, A. C. (2005). *Rönesanstan günümüze resim sanatının öyküsü*. Literatür Yayıncılık.

Kroll, A. (2023). Architecture Classics: Unite d' Habitation / Le Corbusier. Retrieved from: https://www.archdaily.com/85971/ad-classics-unite-d-habitation-le-corbusier . Date of access: 13.03.2023.

Kroll, A. (2023). AD Classics: Barcelona Pavilion / Mies van der Rohe. Retrieved from: https://www.archdaily.com/109135/ad-classics-barcelona-pavilion-mies-van-der-rohe . Date of access: 13.03.2023.

Kroll, A. (2023). AD Classics: AD Classics: Lovell House / Richard Neutra. Retrieved from: https://www.archdaily.com/104713/ad-classics-lovell-house-richard-neutra . Date of access: 15.06.2023.

Kroll, A. (2023). Architecture Classics: Villa Savoye / Le Corbusier. Retrieved from: https://www.archdaily.com/84524/ad-classics-villa-savoye-le-corbusier . Date of access: 25.06.2023.

Küçükalp, K. (2010). Nietzsche ve postmodernite. İstanbul: Kibele Yayıncılık.

Lablog (2014). Atlas of Interiors. Philip Johnson, Glass House, New Canaan, USA, 1949. Retrieved from: https://www.atlasofinteriors.polimi.it/2014/03/19/philip-johnson-glass-house-usa-1949/. Date of access: 12.04.2022.

Lawrence, J.; Miller, C.; Smith, D.A.; Taylor, J. Application Books Architecture, 3rd ed.; NTV Publications: Istanbul, Turkey, 2012.

Le Corbusier, A., & Schreiber, E. (1991). Precisions on the present state of architecture and city planning: with an American prologue, a Brazilian corollary followed by the temperature of Paris and the atmosphere of Moscow.

Lefebvre, H. (2007). Rythmanalysis: Space, time and everyday life. Continuum.

Leiva, F. (2023). Villa Savoye by Le Corbusier: A Masterpiece of Modern Architecture. Retrieved from: https://archeyes.com/the-villa-savoye-le-corbusier/ . Date of access: 13.03.2023.

Lerner, I. (2008). Towards an Understanding of the Analogical and Digital interface in Architecture by Means of Communication and Cultural Theory. In ARCC Conference Repository.

Leuthäuser, G. (2001). Architecture in the Twentieth Century; Taschen: Cologne, Germany, Volume 1.

Levere, J. (2019). Frank Lloyd Wright's Famed Robie House Completes Painstaking Restoration. Retrieved from: https://www.architecturaldigest.com/story/frank-lloyd-wright-robie-house . Date of access: 07.05.2022.

Litman, T. (2010). Sustainability and Livability: Summary of Definitions, goals, Objectives and Performance ˙Indicators.

Liu, J. (2017). Anatomy of Gaudi's Curve Architectural Language. Journal of Arts and Humanities, 6(7), 33-38.

Madsen, O. J. (2014). Modernity. *Encyclopedia of critical psychology*, 1199-1204.

Man, S. T. (2017). Plastik sanatlarda sanat nesnesi ve mekân ilişkisi.

Manaugh, G. (2008). BLDGBLOG, The Rule of Regulations. Retrieved from: https://bldgblog.com/2008/09/the-rule-of-regulations/ . Date of access: 07.04.2023.

Manzi, T.; Lucas, K.; Jones, T.L.; Allen, J. (Eds.) (2010). Social Sustainability in Urban Areas: Communities, Connectivity and the Urban Fabric; Routledge: New York, NY, USA.

Manzoni R. (2012). Barcelona Pavilion Mies Van Der Rohe Analysys, Research, Drawings & Renders. Retrieved from: https://riccardomanzoni.files.wordpress.com/2012/09/foliomanzoni_digitalrapresentation.pdf . Date of access: 05.03.2022.

Massey, D. (2001). Space, place, and gender. 3. Baskı

McKenzie, S. (2004). Social Sustainability: Towards Some Definitions; Hawke Research Institute: Adelaide, Australia.

Meadows, D. H., Meadows, D. L., Randers, J., & Behrens III, W. W. (1972). The limits to growth-club of rome.

Mehmeti, L. (2014). Architecture Analyses of Le Corbusier's Villa Savoye.

Melvin, J., & Şahin, M. (2009). *İzmler: mimarlığı anlamak*. Yem Yayın.pp.98, 99.

Menga, L. (2022). Industrial Revolution and the Birth of Modern Architecture. *International Scientific Journal Vision*, *7*(1), 105-123.

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.

Mert, V. (2007). Rönesans' tan Günümüze, Resim Sanatında Mekan, Mekan Algılayışı ve Bakış (Doctoral dissertation, Marmara Universitesi (Turkey).

Merchant, S., Shi, j., Ru, S., Ratajczak, N. (2012). Diagrams: An In-Depth Analysis Of The Design Of The Rietveld-Schroder House. Retrieved from: http://rietveldschroderhouse.blogspot.com/2012/12/diagrams-in-depth-analysis-of-design-of.html . Date of access: 01.09.2021.

Merrill, E., M. (2016). Khan Academy, Peter Behrens, Turbine Factory. Retrieved from: https://www.khanacademy.org/humanities/art-1010/architecture-design/international-style/a/peter-behrens-turbine-factory . Date of access: 08.04.2023.

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.

Mgbemena, E. E., & Okonta, E. (2018). How International was International Style of Architecture? *American Journal of Civil Engineering and Architecture*, *6*(1),

Michael, Y. M. A. K., & Peacock, C. J. (2011). Social sustainability: A comparison of case studies in UK, USA and Australia. In *17th Pacific Rim Real Estate Society Conference, Gold Coast* (pp. 16-19).

Mirzaei, R. (2013). Organic Architecture Means for Sustainability Goals. *Advanced Muscle Integration Technique (AMIT)*, *2*(23), 1-12.

Moffett, M., Fazio, M. W., & Wodehouse, L. (2003). A world history of architecture. Laurence King Publishing.

Moffett, M.; Fazio, M.W. (2003). Wodehouse, L. A World History of Architecture; Laurence King Publishing: London, UK.

Mofidi Shemirani S.M, Akhtar Kavan M, Akhtar Kavan .H, (2008). "Sustainable Architecture, Energy and Environment", the Second Conference and Specialized Fair of Environment Engineering, Tehran University, Iran.

Moldan, B., Janoušková, S., & Hák, T. (2012). How to understand and measure environmental sustainability: Indicators and targets. Ecological indicators, 17, 4-13.

Moldan, B., Janoušková, S., & Hák, T. (2012). How to understand and measure environmental sustainability: Indicators and targets. Ecological indicators, 17, 4-13.

Molloy, C., J. (2023). AD Classics: Casa Milà / Antoni Gaudí. Retrieved from: https://www.archdaily.com/367681/ad-classics-casa-mila-antoni-gaudi . Date of access: 20.06.2023.

Morelli, J. (2011). Environmental sustainability: A definition for environmental professionals. J. Environ. Sustain., 1, 2.

Mutlu, B. (2001). Mimarlık Tarihi. Ders notları I. Mimarlık Vakfı Enstitüsü Yayınları.

Mutlu, B. (2001). Mimarlık Tarihi. Ders notları I. Mimarlık Vakfı Enstitüsü Yayınları.

Naibei, P. (2014). Cultural and Sustainable Development. In Conference Paper. DOI (Vol. 10, No. 2.1, pp. 2692-9928).

Naja, R. (2023). AD Classics: Swiss Pavilion / Le Corbusier. Retrieved from: https://www.archdaily.com/358312/ad-classics-swiss-pavilion-le-corbusier . Date of access: 13.03.2023.

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.

Nia, H.L. (2002). “The outside is the Result of an Inside”: Some Sources of One of Modernism’s Most Persistent Doctrines. J. Archit. Educ., 56, 23–33.

Office of the Federal Register (US) (Ed.) (2009). Code of Federal Regulations, Title 26, Internal Revenue, PT. 1 (Sections 1.908–1.1000), Revised as of 1 April 2009; Government Printing Office: Washington, DC, USA.

Oktay, D. (2007). An analysis and review of the divided city of Nicosia, Cyprus, and new perspectives. Geography, 92, 231–247.

Owen, C., & Dovey, K. (2008). Fields of sustainable architecture. The journal of architecture, 13(1), 9-21.

Ozay, N. A. (2005). comparative study of climatically responsive house design at various periods of Northern Cyprus architecture. Build. Environ., 40, 841–852.

Özcan, U., & Ürük, Z. F. (2019). Modern Mimarlikta Le Corbusier Etkisi ve Villa Savoye Mutfağı. International Journal of Social and Humanities Sciences, 3(1), 57-68.

Özdemir, S. (2018). Two Walls of Lefkoşa: The Validity of Division. İdealkent, 9(23), 30-57.

Özorhon, İ. F. (2002). Mimari Mekan Kimliğini Belirleyen Yönüyle Doğal Işık (Doctoral dissertation, Fen Bilimleri Enstitüsü).

Özsavaş Uluçay, N. (2020). A method proposal for interior design analysis via Villa Savoye. J. Art Arch. Stud, 9(1), 05-13.

Özyalvaç, A. N. (2013). Mimarlıkta modernite kavramı ve Türkiye. *FSM İlmi Araştırmalar İnsan ve Toplum Bilimleri Dergisi*, (1), 294-306.

Paris Tourist Office Official Website. (2023). Maison La Roche. Retrieved from: https://en.parisinfo.com/paris-museum-monument/71409/Maison-La-Roche . Date of access: 08.04.2023.

Pasaogullari, N. & Doratlı, N. (2009). Design principles of public open spaces in the walled cities: A Study in the Walled City of Nicosia, Cyprus. Lefkoşa: Near East University Press.

Pereira, H. N. (2007). Contemporary trends in conservation: culturalization, significance and sustainability. City & Time, 3(2), 15-25.

Perrone, R., & Büchler, D. (2002). An investigation of futurist architectural design. *Anales de la EAD*, *6*, 1-15.

Perez, A. (2023). AD Classics: The Farnsworth House / Mies van der Rohe. Retrieved from: https://www.archdaily.com/59719/ad-classics-the-farnsworth-house-mies-van-der-rohe . Date of access: 13.03.2023.

Perez, A. (2023). AD Classics: Fallingwater House / Frank Lloyd Wright. Retrieved from: https://www.archdaily.com/60022/ad-classics-fallingwater-frank-lloyd-wright?ad_source=search&ad_medium=projects_tab . Date of access: 02.07.2023.

Perez, A. (2010). Archdaily, AD Classics: The Farnsworth House / Mies van der Rohe. Retrieved from: https://www.archdaily.com/59719/ad-classics-the-farnsworth-house-mies-van-der-rohe. Date of access: 08.07.2023.

Pevsner, N. (1977). Ana çizgileriyle Avrupa mimarlığı. *İstanbul: Cem Yayınevi*.

Polat, E. E., & Can, C. (2008). The Concept of Modern Architectural Heitage: Definiton and Content//Modern Mimarlık Mirası Kavramı: Tanım Ve Kapsam. Megaron, 3(2), 177.

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.

Pourdehqan, B.; Rashidi, M.; Saeed Firouzbakht, M.; Najafi, N. (2015). Environment and Sustainable Architecture. Eur. Online J. Nat. Soc. Sci. Proc., 4 (Suppl. S3), 5.

Prina, Francesca, and Elena Demartini. (2006). "1000 years of world architecture: an illustrated guide.".

Proskuryakov, V., Bohdanova, Y. U. L. I. Y. A., & Yuriychuk, R. U. S. L. A. N. (2018). “International style” and its interpretation at the beginning of the XXI century. *Środowisko Mieszkaniowe*, (23), 172-177.

Prucnal-Ogunsote, B. (2001). Classification of Nigerian architecture. *Aarches Journal*, *1*(6), 48-56.

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.

Reshetnikova, T. S. (2020). Experiment in Architecture and Bauhaus-Weimar. *AIS-Architecture Image Studies*, *1*(1), 144-155.

Roth, L. M. (2002). Mimarlığın öyküsü (2. Baskı). Kabalcı Yayınevi.

Roth, L. M., & Akça, E. (2002). Mimarlığın öyküsü: öğeleri, tarihi ve anlamı. Kabalcı Yayınevi.

Rowe, H.A. (2011). The rise and fall of modernist architecture. Inq. J., 3, 1.

Ruschak, P., R. (2023). ArchEyes, Frank Lloyd Wright’s Fallingwater: The Edgar J. Kaufmann House. Retrieved from: https://archeyes.com/fallingwater-house-frank-lloyd-wright-edgar-kaufmann/ . Date of access: 02.07.2023.

SouthET. (2023). Barcelona Pavilion of Mies van der Rohe. Retrieved from: https://southeuropetravel.com/barcelona-pavilion-mies-van-der-rohe/ . Date of access: 15.06.2023.

Şahin, J. (2013). *Zymunt Baumanın modernite eleştirisi* (Master's thesis, Sosyal Bilimler Enstitüsü).

Şahin, S.T. (2022). 1930–1980 Yılları Arasında Üretilen Gaziantep Modern Mimarlık Yapılarının Cephe ve Kütle Özelliklerinin ˙Incelenmesi. Master’s Thesis, Necmettin Erbakan Üniversitesi Fen Bilimleri Enstitüsü, Konya, Turkey.

Sakınç, E. (2006). Sürdürülebilirlik bağlamında mimaride güneş enerjili etken sistemlerin tasarım öğesi olarak değerlendirilmesine yönelik bir yaklaşım.

Sarcan, A., & Gürbüz, A. (2020). Modern resim sanatında soyut mekan kurguları ve mekansal kavrayışa dair sorgulamalar (Master's thesis, Sosyal Bilimler Enstitüsü).

Sarıgül, A. İ. (2008). *Mimarlıkta gelecekçilik* (Doctoral dissertation, DEÜ Fen Bilimleri Enstitüsü).

Schoenefeldt, H. (2012). Creating the right internal climate for the Crystal Palace. Proc. Inst. Civ. Eng. Eng. Hist. Herit., 165, 197–207.

Şeren, T. T. (2017). Mimari Evler 1/ Walter Gropius. Accessed 25 January 2023. https://www.mimarizm.com/haberler/gundem/mimar-evleri-1-walter-gropius_128064

Sezer, C. (2009). Kübizm'de Yüzeyin Çizgisel Düzenlemesi. Eskişehir Osmangazi Üniversitesi Sosyal Bilimler Dergisi, 10(1), 289-304. Retrieved from: https://dergipark.org.tr/en/pub/ogusbd/issue/10995/131584 . Date of access: 07.09.2021.

Shannon, G. J., & Shannon, M. S. (2020). Le Corbusier and the Daughter of Light: Color and Architecture of Maison La Roche. *Journal of Interior Design*, *45*(4)

Sherrye, C. (1985). Arthur Dove: Nature as Symbol; UMI Dissertation Services: Ann Arbor, MI, USA.

Shtern, M., Sonan, S., & Papasozomenou, O. (2022). City profile: Nicosia. Cities, 130, 103866.

Simic, A. (2006). *Le Corbusier's Purist Period and the Concept of Truth in Architecture* (Doctoral dissertation, University of Cincinnati).

Simon, M. (2016). Khan Academy, Le Corbusier, Villa Savoye. Retrieved from: https://www.khanacademy.org/humanities/ap-art-history/later-europe-and-americas/modernity-ap/a/corbusier-savoye . Date of access: 08.04.2023.

Slutzky, R. (1987). Après le Purisme. *Assemblage*, *4*, 95–101.

Southern Living House Plans. (2021). Martin. Retrieved from: https://houseplans.southernliving.com/plans/SL1863 . Date of access: 17.08.2021.

Soflayi.f. (2006). "Today Building for Tomorrow (A review of basics and projects of sustainable architecture)", forth international seminar of fuel consumption optimization in building, Tehran, Iran, 2006.

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.

Sözen, M. (1996). Cumhuriyet Dönemi Türk Mimarisi

Sroat, H. (2005, April). Brutalism: An Architecture of Exhilaration. In *Paul Rudolph Symposium*

Sutton, P. (2004). A perspective on environmental sustainability. Paper on the Victorian Commissioner for Environmental Sustainability, 1, 32.

Sveiven, M. (2023).AD Classics: AD Classics: Casa Batlló / Antoni Gaudí. Retrieved from: https://www.archdaily.com/90689/ad-classics-casa-batllo-antoni-gaudi . Date of access: 12.03.2023.

Tang, L. (2015). Complejo Teresa Carreño. Retrieved from: https://www.scribd.com/presentation/492827814/H3-EV4-GRUPO-2-Complejo-Teresa-Carreno . Date of access: 03.04.2023.

Tanyeli, U. (1997). "Modern Mimarlık" maddesi, Eczacıbaşı Sanat Ansiklopedisi, II. Cilt, YEM Yayını, İstanbul

Tegethoff, W., & van der Rohe, M. (1985). The Villas and Country Houses. Nueva York, MOMA.

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.

Ufuklar, (2019) A. Y. Mimarlık, Planlama ve Tasarım.

Uğur Tanyeli (1997). Modern Mimarlık", Eczacıbaşı Sanat Ansiklopedisi, II, s. 1286.

Uluçay P. & Uraz, T. & Pulhan H., (2006). Modernizmin Yerel Açılımları Suna - Ümit Süleyman Evi – Lefkoşa, Mimarca 73, Mimarlar Odası Dergisi, ISSN 1306-3138 YIL:17 SAYI :73

UNESCO, (2010). World Heritage Convention, Rietveld Schröderhuis (Rietveld Schröder House). Retrieved from: https://whc.unesco.org/en/list/965. Date of access: 20.06.2023.

Üstün, B. (2008). Sürdürülebilir Mimarlık Kapsamında Kağıdın Çatı ve Cephe Sistemlerinde Kullanımı: Shigeru Ban'ın Tasarımları. Çatı ve Cephe Dergisi, Teknik Makale, 22, 15-18.

Vallance, S.; Perkins, H.C.; Dixon, J.E. (2011). What is social sustainability? A clarification of concepts. Geoforum, 42, 342–348.

van de Ven, C. (1978). Space in Architecture. Amsterdam: Van Gorcum Assen

Vandenhende, K. (2015). Learning how to design architecture form the Villa Savoye design process. Retrieved from: http://ocs.editorial.upv.es/index.php/LC2015/LC2015/paper/viewFile/723/1292 . Date of access: 18.07.2021.

van Thoor, M. T. (2019). The Restorations of the Rietveld Schröder House. A Reflection. Bulletin KNOB, 15-31.

Vandevyvere, H., & Heynen, H. (2014). Sustainable development, architecture and Modernism: aspects of an ongoing controversy. In Arts (Vol. 3, No. 4, pp. 350-366). MDPI.

Vellinga, M. (2013). The noble vernacular. The Journal of Architecture, 18(4), 570-590.

Venturi, R. (2005). Mimarlıkta karmaşıklık ve çelişki. Şevki Vanlı Mimarlık Vakfı yayınları.

Vergo, P. (1981). Art in Vienna 1898-1918: Klimt, Kokoschka, Schiele and Their Contemporaries.

Vertazontal, (2012). Reddit, The Robie House by Frank Lloyd Wright. Retrieved from: https://www.reddit.com/r/ArchitecturePorn/comments/1bm0bg/the_robie_house_by_frank_lloyd_wright_1920x1080/?rdt=36146 . Date of access: 13.09.2022.

Wadsworth, S.M. (2011). Destroying Tradition and Rebuilding. In The Spiritual in Twentieth Century Art; Pollock, J., Stravınsky, I., Wright, F.L., Eds.; Dover Publications: Mineola, NY, USA.

Wainwright, O. (2021). The Guardian. Retrieved from: https://www.theguardian.com/artanddesign/2021/aug/30/curse-mies-van-der-rohe-puddle-strewn-gallery-david-chipperfield-berlin-national . Date of access: 12.04.2022.

Wheeler, D. (2016). Architecture Drawing & Design I Blog, Farnsworth House. Retrieved from: https://wheelerdrafting.weebly.com/archive-arch-i/archives/03-2016 . Date of access: 15.09.2022.

White, M. (2003). De Stijl and Dutch Modernism; Manchester University Press: Manchester, UK, p. 39.

White, J., Paul. (2010). Barcelona Pavilion - Mies van der Rohe. Retrieved from: https://www.flickr.com/photos/pauljw/5255085015 . Date of access: 05.03.2022.

White, J., James. (2023). "Futurism". Encyclopedia Britannica. Retrieved from: https://www.britannica.com/art/Futurism. Date of access: 14 March 2023.

Williams, R. A. (2014). Vocabulary of Culture and Society; Oxford University Press: Oxford, UK.

Williamson, T. J., Radford, A., & Bennetts, H. (2003). Understanding sustainable architecture. Taylor & Francis.

Wingler, Hans Maria, and Carlos Sambricio. (1975). *La Bauhaus: Weimar, Dessau, Berlín, 1919-1933*. Gustavo Gili.

Winter, E. (2007). Aesthetics and Architecture. Br. J. Aesthet., 48, 235.

Winterbourne, A. (1988). The Ideal and the Real. An Outline of Kant's Theory of Space. Time and Mathematical Construction (Dordrecht: Kluwer, 1988).

Wordpress, (2021). Gerrit Rietveld's Schröder House Ground Plan. Retrieved from: https://histarq.files.wordpress.com/2013/04/21b-rietveld-schroder-house-plan2.jp. Date of access: 01.09.2021.

World Commission on Environment and Development. (1987). World commission on environment and development. Our Common Future, 17, 1–91.

Yasemin, Kaya & Bıçkı, D. (2006). 'Sürdürülebilirlik'argümani ve 'Derin Ekolojik' itiraz. *Gazi Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, *8*(3), 231-249.

Yavuz, E. (2021). Kıbrıs' ta Bir Modern: Abdullah Onar, Konut Ve Modern Bir Yaşamın Tasarımı.

Yeang, K., & Richards, I. (2007). Eco skyscrapers I. Images Publishing.

Yenidünya, S.S.; Limoncu, S. (2020). Determination of Sustainability Criteria for Building Renewal Applications: A Systematic Literature Review and Meta-Analysis//Bina Yenileme Uygulamaları için Sürdürülebilirlik Ölçütlerinin Belirlenmesi: Sistematik Literatür Taraması ve Meta Analizi. Megaron, 15, 270.

Yeşilyurt, E. (2008). *Biyoloji temelli bilimsel kuramlar ile mimari tasarım ilişkisi* (Doctoral dissertation, Fen Bilimleri Enstitüsü).

Yıldırım, M. (2009). Modernizm, postmodernizm ve kamu yönetimi. *Uluslararası İnsan Bilimleri Dergisi*, *6*(2), 380-397.

Yırtıcı, H. (1996). Modern Mimarlığın Süreklilikleri 20. yüzyıl Modernizmi İçin Ortak Bir Zemin Oluşturma Çalışması (Doctoral dissertation, Fen Bilimleri Enstitüsü).

Young, J. M. (1984). JV Buroker, Space and Incongruence. The Origin of Kant's Idealism, pp8-12.

Z˙ ychowska, M.J. (2019). Bauhaus—Didactic Experiments and Their Legacy. Glob. J. Eng. Educ., 21, 134–138.

Zabihi, H., & Habib, F. (2012). Sustainability in building and construction: revising definitions and concepts. International Journal of Emerging Sciences, 2(4), 570.

Zbašnik-Senegačnik, M., & Kuzman, M. K. (2014). Interpretations of Organic Architecture. *Prostor*, *22* (2).

Zevi, B. (2015). Mimarlığı Görebilmek. İstanbul: Daimon Yayınları.

Zhao, Q. (2021). From Functionalism to “Meaning Space”: the Semantic Shift of Modern Architecture.

Zorn, A. (2017). AD Classics, Diagrams of the Rietveld Schroder House Reveal its Graphic and Geometric Brilliance. Retrieved from: https://www.archdaily.com/875223/diagrams-of-the-rietveld-schroder-house-reveal-its-graphic-and-geometric-brilliance . Date of access: 01.09.2021.

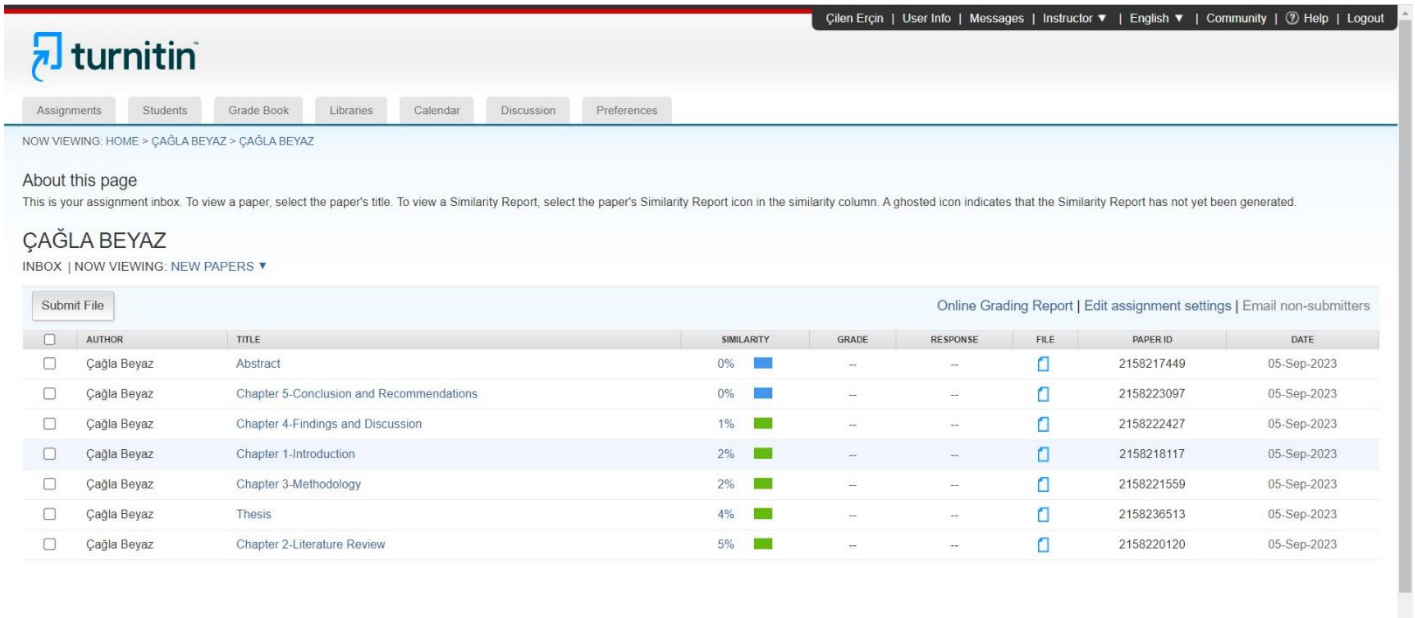
Żychowska, M.J. (2019). Bauhaus—Didactic Experiments and Their Legacy. Glob. J. Eng. Educ., 21, 134–138

20 th Century Architcture (2023). International Style. Retrieved from: http://architecture-history.org/schools/INTERNATIONAL%20STYLE.html . Date of access: 08.04.2023.

APPENDICES

Appendix A

Turnitin Similarity Report



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Çağla Beyaz	Chapter 4-Findings and Discussion	1%	--	--		2158222427	05-Sep-2023
Çağla Beyaz	Chapter 1-Introduction	2%	--	--		2158218117	05-Sep-2023
Çağla Beyaz	Chapter 3-Methodology	2%	--	--		2158221559	05-Sep-2023
Çağla Beyaz	Thesis	4%	--	--		2158236513	05-Sep-2023
Çağla Beyaz	Chapter 2-Literature Review	5%	--	--		2158220120	05-Sep-2023

CV

1. Name Surname : Çağla Beyaz Bolat
2. Date of Birth : 10.06.1987
3. Title : M.A.
4. Education Status : Master
5. Institution : Near East University

Degree	Department	University	Date
U.G.	Interior Architecture	Near East University	2010
Master	Interior Design	Florence Design Academy	2011
Doctoral	Interior Architecture	Near East University	Continuing

5. Academic Titles

Assistant Professor (Date):

Associate Professor (Date):

Professor (Date):

6. Administered Master's and Doctoral Theses

6.1. Postgraduate Theses

6.2. Doctoral Theses

7. Publications

7.1. Articles published in internationally refereed journals (SCI, SSCI, Arts and Humanities)

Beyaz, Ç., Mercan, Ö., Anıl, G., & Okutan, H. (2017). Konut Transformasyonu Bağlamında Lefke'deki CMC Evlerinin Zaman İçerisindeki Dönüşümü/The Gradual Transformation of CMC Houses in Lefke within the Context of Housing Transformation. *Journal of History Culture and Art Research*, *6*(3), 713-738.

Beyaz, C., & Asilsoy, B. (2019). Knowledge of green buildings and environmental worldview among interior design students. *International journal of advanced and applied sciences*, *6*(1), 29-36.

Beyaz, Ç., & Erçin, Ç. (2023). Evaluation of Modern Architecture Criteria in the Context of Sustainability and Architectural Approach; Modern Period in North Nicosia. *Sustainability*, *15*(13), 10005.

7.2. Articles published in other international peer-reviewed journals

Mercan, Ö., & Beyaz, Ç. (2021). Çevirimiçi Çalıştaylar ve İç Mimarlık Eğitimi: Le Design De PA PA Pandemik Paradokslar Çalıştayı Üzerinden Bir Değerlendirme. YDÜ Mimarlık Fakültesi Dergisi. Cilt 3, Sayı 2. Lefkoşa.

7.3. Papers presented at international scientific meetings and published in the proceedings book

7.4. International books or chapters in books written

7.5. Articles published in national peer-reviewed journals

7.6. Papers presented at national scientific meetings and published in the proceedings book

7.7. Other publications

8. Projects

Exhibition participant titled “Create Your Own Project” at Florence Design Academy in Florence, Italy, on 16 December 2011.

Workshop coordinator and participant named “Design Technical Solution” within the Faculty of Architecture between 22-23 May 2014.

Workshop coordinator and participant named “Border” within the Faculty of Architecture between 21-22 May 2015.

Workshop coordinator and participant named “The Contemporary Gate” within the Faculty of Architecture between 11 May 2018.

Workshop coordinator and participant named "Body and Shape" within the Faculty of Architecture between 24-26 May 2019.

9. Administrative Missions

2020 – Continuing, NEU Faculty of Architecture, Interior Arhitecture Department Courses Coordinator.

2013 – Continuing, Undergraduate Student Transfer Committee Member (Department of Interior Architecture.

10. Memberships to Scientific Organizations

11. Awards

12. Please fill out the chart below for undergraduate and graduate courses you have given in the last 2 years.

Academic Year	Semester	Course	Weekly Course Hours		Number of Students
			Theoretical	Practical	
2021-2022	Fall	IAR201 Interior Design Studio I	4	4	30
		IAR202 Interior Design Studio II	4	4	10
		IAR205 Environmental Design	2	1	34
		IAR103 Color Theory and Presentation	2	1	12
		FAE445 Concept of Color in Architecture	2	1	15
	Spring	ICM102 Tasarımın Temelleri II	4	4	25
		IAR201 Interior Design Studio I	4	4	35
		IAR202 Interior DesignStudio II	4	4	10
		IAR304 Furniture Design	2	1	20
		IAR404 Interior Design; Professional Practice	2	1	15
		ICM404 İç Mimarlıkta Mesleki Uygulama	2	1	15
		INAR424 Basic Art Education	0	3	15
	Summer	IAR302 Interior DesignStudio IV	4	4	5

		ICM302 İç Mimarlık Stüdyosu IV	4	4	10
2022-2023	**Fall**	IAR401 Interior DesignStudio V	4	4	10
		ICM401 İç Mimarlık Stüdyosu V	4	4	10
		TMF425 Meydan Tasarımı	0	3	8
		IAR205 Environmental Design	2	1	15
		IAR103 Color Theory	2	1	10
		IAR101 Basics of Interior Design I	4	4	8
		ICM101 Tasarımın Temelleri I	4	4	30
	Spring	IAR102 Interior Design Studio I	4	4	20
		IAR302 Interior Design Studio IV	4	4	10
		ICM302 İç Mimarlık Stüdyosu IV	4	4	25
		IAR304 Furniture Design	2	1	30
		IAR404 Interior Design; Professional Practice	2	1	10
		ICM404 İç Mimarlıkta Mesleki Uygulama	2	1	25
		IAR106 Descriptive Geometry	2	1	10
	Summer	IAR402 Graduation Project	4	4	14