

Persian translation of this paper entitled:

معماری کیوبیک و معماری مسکونی مدرن در ترکیه و ایران (دهه ۱۹۳۰)
is also published in this issue of journal.

Cubic Architecture and Modern Residential Architecture in Turkey and Iran (1930s)

Mohammadhamed Mousavi*

Khosrow Afzalian**

Zahra Fanaei***

Abstract

By investigating the modern architecture in Turkey and Iran, it is observed that the “modern house” discourse is a major part of the architecture in these two countries. The modern architectural idealists in the West introduced residential architecture as the essence of modern architecture and considered it an important and significant subject. Naturally, this view was influenced by the culture of Turkish-Iranian architecture in the early twentieth century. Therefore, it is necessary to study the effects of modern architecture on the residential architecture of these countries and understand the reasons for their similarities and differences. Hence, this paper seeks to study the impacts and their causes. The purpose of this study is to investigate the effect of cubic architecture on modern residential buildings in Iran and Turkey, and presents comparative study on the developments in residential architecture of the two countries in the early twentieth century. In this study, the differences and similarities between the underlying factors and the developments of residential architecture were have been investigated in two countries. Alao we have tried to present the comparative study of developments in Residential Architecture in the 1930s, for both countries.

In this study, a comparative- analytical research method has been used. Library method has been used to gather the information. three buildings from Iran and three buildings from Turkey have been selected to do th comparative study. Then the characteristics were evaluated for the purpose of comparison. The results of this study show that, a comparative study on residential architecture from different aspects in the two periods of the republic and Pahlavi I, thre is general similarity in follow-up of Bauhaus and expressionism current in the emergence of fundamentally new forms of residential architecture of this period. Cubic houses have different structural and formal qualities. The structure of the organization of the cubic Plans can be divided into four categories: Plans with a central plateSoffeh, an inner plateSoffeh, an external plateSoffeh and without plateSoffeh that have a mutual relationship with the traditional architecture of these countries.

Keywords

Cubic Architecture, Residential Architecture, Pahlavi I, Turkey, Bauhaus, Expressionism.

*. Department of Architecture, Najafabad Branch, Islamic Azad University, Najafabad, Iran. Mohamo@gmail.com

** . Department of Architecture, Mashhad Branch, Islamic Azad University, Mashhad, Iran.

Department of Architecture, Najafabad Branch, Islamic Azad University, Najafabad, Iran. Corresponding author, Khosrow.afzalian@gmail.com

***. Department of Art Research, Najafabad Branch, Islamic Azad University, Najafabad, Iran. Zahraf1351@gmail.com

Introduction

From the beginning, the modernization project in the countries of Turkey and Iran was deeply ambiguous. The leaders of the republic and Pahlavi I sought to import western forms, institutions, and lifestyle Without considering the feeling of alienation and individual mentality that was centered on the experience of modernity

The modern architects of these countries wanted to participate in the transformation of society using modern architecture products. 1930s architects focused on two axes: Awareness of the society in order to better understand the architecture profession and to create conditions for the acceptance of modern architecture in society, These issues were subdivided into clandestine ideological problems such as nationalism, rationalism and, to some extent, regionalism, so that the flow of nationalism was related to architects' demands in creating social awareness of the architectural profession, and also rational and regionalist movements were effective in providing the conditions for social acceptance of modern architecture. (İmamoğlu, 2010: 35).

Statement of Problems

By investigating the modern architecture in Turkey and Iran, it is observed that the “modern house” discourse is a major part of the architecture in these two countries. The modern architectural idealists in the West introduced residential architecture as the essence of modern architecture and considered it an important and significant subject. Naturally, this view was influenced by the culture of Turkish Iranian architecture in the early twentieth century. However, the importance of residential architecture was exacerbated by intensified by the revolutionary- political atmosphere of the early twentieth century in Turkey and Iran. Therefore, investigating the effect of the cubic architecture on the residential architecture of these countries and the reasons for their similarities and differences is necessary. The question of this research is: how has the cubic architecture affected modern residential

architecture in Iran and Turkey in the early twentieth century? The residential architecture of Turkey and Iran in the early twentieth century is influenced by the cubic architecture.

Research Methodology

The present study has been done using comparative-analytical research method. data were collected using library studies. By investigating the Iranian and Turkish contemporary architectural trends, a comparative study was done on the 1930s residential architecture of the two countries and the factors affecting them. Then, first the indices were determined to do a comparative study between the samples. After analyzing the cases, the results were finally expressed.

Research Background

Bozdoğan, while studying and analyzing cubic house in the article entitled “Modern Life: The cubic House in the Culture of the Period of the Early Republic”, first, introduced the social background of the emergence of new architecture and style in the residential culture of Turkish elite class and bureaucrats and then analyzed Ankara's cubic architecture and its impact on the formation of urban middle class life (Bozdoğan, 1996).

Kanpinak in his thesis entitled, “Modernism and Housing, Residential Architecture in the Period of the early Republic of Turkey.” The cultural and social context of Turkey in the 1930s was heavily affected by the Renewal reforms and the official ideology of the Republican regime. The main objective of this detailed study is the residential houses in Istanbul between 1931 and 1940, that analysis of their symbolic and social functions and also their features helps to understand the unique fetures of architecture culture of Republic period (Kanipak, 1998).

Bozdoğan and Akcan in their book, “Turkey, Modern Architecture in History”, divided the major streams of residential architecture of the 1940s and 1930s into three categories: cubic houses, residential

complexes, and new Turkish houses. They believed that The cubic architecture, which served to the decadent and colonial culture of the West, prevents the emergence of a trend of original and modern Turkish architecture. The Turkish Dwelling Culture d during the early Republic period was constantly fluctuating among the demands for a Western and ideal life model for the unique Turkish identity (Bozdoğan, 2012).

at the end, Akcan's doctoral thesis titled, "Modernity in the Transformation of German Turkish Relations and Residential Culture in the Early Twentieth Century," focused on the development of the theory of translation in architecture, and examines the history of intercultural exchange of housing policy and a residential culture in Germany and Turkey in the first half of the twentieth century. This thesis attempts to demonstrate the complex history of the city and modern architecture, looking at homes and housing in the mid-early 20th century (Akcan, 2012).

The studies on the residential architecture of the Pahlavi I era and the comparative study of the architecture of Iran and Turkey, the following studies can be noted. Marefat in his Ph.D. thesis entitled "Power Generation; the Architecture of Tehran in 1921-1941", demonstrated: Reza Shah Pahlavi between 1921 and 1941, transformed Tehran from a traditional Islamic city to a modern capital. Urban network, public spaces, government institutions and new typology of housing reflect the continuous transformation of Tehran's personality during his period (Marefat, 1986).

Marefat in his research not only looked closely at the subject of housing but also illustrated the residential architecture of that period by presenting extensive images of buildings constructed in Tehran. Jannipur in his doctoral thesis entitled, "The evolution of the residential architecture of Tehran during the Pahlavi era", outlines the developments in the residential buildings of Tehran during the Pahlavi I & II periods, and investigates the process of shaping and transforming residential buildings in

Tehran from the first modern residential apartments and Cooperative and cheap houses during the Pahlavi I era, to contemporary vulgar and eclectic housing, and explains the main flows of the Pahlavi residential buildings, as following:

The continuation of the late Qajar housing, the combination of traditional architectural elements with European housing and modern housing. This thesis is very valuable and unparalleled in gathering and analyzing Pahlavi housing in Tehran. And finally, it demonstrates the factors that affect the development of housing architecture in this period as follow: Political and Programmatic Causes due to change in the structure of the state-historical, socio-cultural. This thesis is one of the few types of research on modern residential architecture in Pahlavi I & II periods, which considered the evolution of residential architecture as inevitable in the light of the global conditions (Jannipur, 2001). Zarkesh in his paper, "The Role and Influence of Governmental Elements in the Architecture of Private Buildings in the Pahlavi I Period," writes: Searching for and identifying government agents show that these factors have two aspects: non-physical and physical dimensions. He concludes that during the Pahlavi I Period, The role of government agents has been to continue to make changes, and the existing architectures include the style of Tehran and the syncretist 19th-century European architecture from the mid-Qajar era and the emergence of new methods in the popular architecture largely based on Western architecture. (Zarkesh, 2009).

The thesis of Jamal al-Din Soheil titled "The Impact of Social and Political Factors on the Appearance of National Architectural Movements, a Comparative Study of Iran-Turkey Architecture in the 1950s-1920s." is one of the rare studies which compares Iranian contemporary architecture with the architecture in the countries of the region. This study examines the role of political movements in the advent of national movements in architecture in the Pahlavi I era in Iran and contemporary in

Turkey (Soheili, 2010).

Hassanpour's Ph.D. thesis entitled "Reflection of Traditional Architecture in Turkish Contemporary Architecture from 1940 to 1980 and Compare it with Iran." " ". This study by identifying the factors affecting architecture in Iran and Turkey tries to compare the contemporary architectural developments in both countries. As a result of the comparison of architectural and urban developments in different aspects, along with the general similarity in the follow-up of international trends and its interactions during mentioned period, the tendencies of contemporary architecture in both countries do not match objectively. (Hassanpour, 2015). Hence, according to the studies carried out on the modern residential architecture in the Pahlavi I era, it seems that there are few studies in this area, which addresses the formation of residential architecture trends in this period. Therefore, this study to fill the gap by adopting the modern residential architecture of Iran and Turkey tries to investigate the developments of modern residential architecture in the first Pahlavi period.

Theoretical Foundations of Research

• New urban pattern and cubic architecture

Between 1920 and 1940, the governments of Iran and Turkey were the largest supporters of architecture. They follow ambitious modernization projects to redefine urban space through a new generation of well-trained, foreign and Iranian professional architects. Formation and spatial transformation were part of the city's transformation during this period. However, describing house developments as a simple or inevitable result of social innovations is misleading. The house reflects the values, interests, and expectations of individuals from their private lives, that its shape cannot simply dictated by political powers. Changes in urban scale are only one of the factors influencing the developments in residential architecture in this period (Marefat, 1986: 155). In general, the factors influencing the changes in the residential architecture of the countries of

Iran and Turkey in the early twentieth century can be classified into four categories: the new urban model, new materials, and technologies, the transformation of the interiors and the development of new typology of housing. The first two factors are directly linked to the role of the government in supporting public projects, and the latter two further emphasize the role of architects and their customers in creating these changes (Bozdoğan, 2000:136). The growing medium-sized urban class and their needs demanded new solutions that technology, materials, and structural innovations were replaced with common housing traditions. In this way, a variety of modern homes were created: row houses, apartments and villas (Marefat, 1986:250).

The term "cubism" includes different meanings that may conflict with each other. The initial uses of the term "architecture of cubism" refer to the architecture of the cubic or cubic shapes (i.e., boxes or crystals) [...]. Colomina believes that " while modernity is clearly recognized by the transformation of perception, but Le Corbusier and Ozenfant said that this change was not linked to changes in the artistic forms but it is due to the conditions of perception in urban life, " (Colomina, 1997:148).

The term "cubism" refers only to the architecture of the cubic masses, which was the primary use of the term in the West. Thus, the external appearance was dominated by the perception of the cube rather than the spatial organization and emphasized the need for spatial relations between the home and the environment or between the home and nature through terraces and open spaces (Bozdoğan, 2001:142).

In this way, the basic design principles that have been common for centuries in Iran and Turkey have been changed or replaced with highly differentiated spatial layers. Thus, the nature of construction activities has been generally changed by the growth of speculative housing market in the early twentieth century in Iran and Turkey. With a brief overview, it is possible to observe the blindly adaptation

of West's cubic house in Iran and Turkey, such that in the lower layer of this blindly adaptation, a delicate transformation was taking place, which could be well understood by looking closely at the principles of traditional and modern homes.

Cubic Architecture and Rational Modern House

The idea of a modern nation through the design of a modern home was very attractive for Turkish craftsmen, such that the idea was the main axis of Turkish architectural issues in the early twentieth century. Without considering the architectural developments in Central Europe, especially German and Austrian architects, they focused mainly on home architecture. (Bozdogan, 2001:216).

In Turkey, modern architects such as Seyfi Erkan, Zaki Sayar, Abedin Mortaz, Abdullah Zia and Becir Ehsan, and in Iran, Vardan, Budaghian, Ali Sadegh, Zafar and Pul Abkar, they followed this idea in residential projects in the 1930s. The term cubic (cubic) refers villas and apartments of the 1930s. But the ideal type or paradigm of the dominant cubic house was single-family houses and villas that were praised for such qualities as proximity to nature, sunlight, and healthy living in these houses during 1930s modernism discourse (İmamoğlu, 2010:178). At the same time, Ankara and Tehran were recognized as the modern capitals of Turkey and Iran, and early prototypes of cubic architecture can be seen in new regions such as Yenisehir (New City) and Chankaya in Ankara and Ferdowsi, Enghelab (Shahreza) and Palestine (palace) in Tehran. Presidential Palace buildings (1932-1930), of Mustafa Kemal Atatürk were designed by the Clementz Holzmeister and the Sa'd Abad Palace (1932-1933) was designed by Vartan, to portray the ideals of modern residential architecture. At the same time, these buildings can be regarded as paradigmatic for the cubic villas. The properties of the cubic houses can be outlined as follows:

A Geometric facade, an asymmetric composition of cubes in the facade, strip windows, terraces,

Cantilevers, flat roofs, rounded corners, cubic compositions, vertical spacing in the exterior, Horizontal band windows and windows in the corners, a non-symmetrical organization in the plan, extraversion, and The Soffeh, structural element for organizing the plan, replacing the traditional courtyard with the open and the semi-open spaces (Table 4). The cubic architecture is a reflection of Bauhaus's architecture and German Expressionism in Iran and Turkey. This architecture has been led by architects in Turkey such as the Austrian Halzmeister and the Seifi Turkan Turks and in Iran by Vartan. In general, cubic architecture can be considered Rational and Functional architecture (Table 3).

The term "cubic" houses, which in the early 1930s was a popular style of residential architecture, began to decline in the late 1930s, with the rise of a nationalist wave, along with nationalist attacks on modernist avant-garde in Germany and other European countries. The term "cubic houses" declined, and many architects put modernity in a defensive position (Akcan, 2012:102).

In the following section, the most prominent features of the cubic architecture are compared and analyzed, Circular windows and Round corners, which is found in the residential buildings of Turkey and Iran.

Circular Window

In the residential architecture of the 1930s, we can see Circular windows on the facade of the cubic buildings. It seems that in the modern architecture of the period of the republic and the Pahlavis, Circular Window Causes same references to the fact that organic forms are associated with symbolic and industrial notions in the minds of the architects of this period. Despite the insignificant resources in the construction industry of Iran and Turkey in the early twentieth century, industrialization in architecture was more like a dream that technology was never an effective parameter in modern Turkish architecture and Iran.

The symbolic significance of technological artifacts used in modern Western architecture such as airplanes, cars, and ships was not related to Iran and Turkey position. However, the forms created by these artifacts, as a representation of modernism and the Circular window as one of these symbols, was praised and welcomed by modern architects. Most European architects considered the Circular window related to technological issues and considered it as a way to demonstrate function oriented and technological rationalism in the early 20th century. They put a circular window in spaces such as basements, parking lots, and stairs or in the bathroom. These architects were more closer to rationalism than to the conventional aesthetic rules of modern architecture. So the idea of modernization with the use of organic lines and round window as a sign of the machine age was created in the residential architecture of this period. (Kanpinak,1998:82). As it seen at Reza Shah Palace in Saadabad and the summer villa of Mustafa Kemal Atatürk, in Flora Istanbul, it is easy to see the aesthetics of the machine age in the early twentieth century. Based on what has been discussed it can be concluded that the round window is an indirect reference to the technological tools presented by modern Western architecture and, it is a symbol of

modernization.

Round corners

The cubic architecture in Turkey and Iran, in addition to the Circular window, widely used Round corners as a formal feature. Although these characteristics can be correlated with machine metaphor in the early 20th century. Firstly, the modernization of modern architecture in Turkey and Iran does not happen quickly, but there is a long process to develop the formal language of modern 1930s architecture. Second, the architects had to struggle with the inadequate construction industry and the weakness of the national economy. However, contrary to what the architects claimed, the forms of the modern residential architecture of the 1930s were radically new and at first glance, this formal language attracted the attention of viewers, However, the organization of the plan and the performance of the residential houses of the 1930s did not differ much from the previous decades. In this transitional phase, architects needed a more formal feature to prove their argument about the radical and revolutionary nature of modern architecture. Therefore, round corners were widely accepted by the architects of this period (Kanpinak,1998:84-85). In the cities of Tehran and Ankara before the 1930s, only the curved surfaces of the cubic apartments could be

Table 1. Circular window, Turkish and Iranian Cubic Architecture. Source: authors.

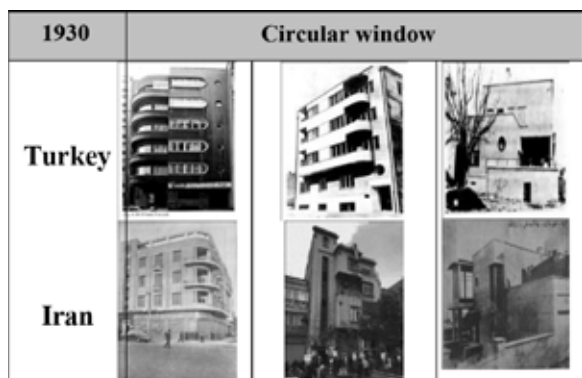
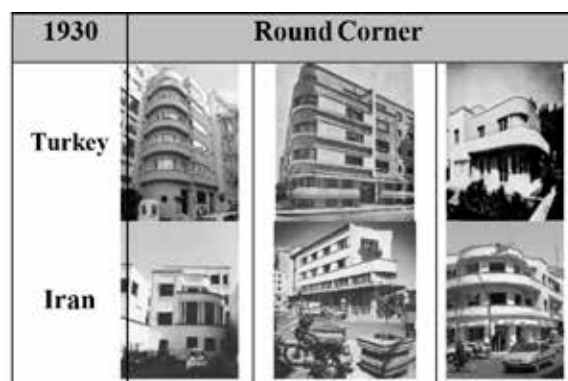


Table 2. Round Corner, Turkish and Iranian Cubic Architecture. Source: authors.



a new extreme form. This visual alienation, like a rounded window, would lead to greater awareness on modernization.

Findings

According to surveys, the rounded windows were not as large as Western samples in the houses of Turkey and Iran. Usually, in the organization of the plan, the Round space was assigned to the living room. Since the row windows were one of the characteristics of modern residential architecture, Turkish and Iranian architects tended to use it in their projects. In many of these spaces, the row windows can be seen in an external view. In general, Round corners were one of the important features of the modern residential architecture in 1930s. The features such as: responding to visions and landscapes, emphasis on spatial planning, creating conflict and alienation in urban environments, and increasing social awareness on modernization.

Discussion

The difference between the present study and the previous researches was determined considering the study history. Studies in the field of Pahlavi Residential Architecture are more than studies done on adaptive comparisons between Turkish and Iranian residential architecture in this period. even, the studies on housing in the Pahlavi period was very general, whereas the focus of the present study was more limited on on the adaptation of residential architecture in Turkey and Iran and investigates the impact of the cubic architecture on the modern residential architecture of both countries in the early twentieth century. As already mentioned, the architects of the 1930s, in response to a set of rational criteria, the functional and hygiene of modern architecture sought social acceptance of modernization in society, in order to become an architectural profession as a necessary ground for the process of building construction and civilization (İmamoğlu, 2010:45).

The idea of expanding Westernism and secular reforms

to the private realm, family law, and home space was a bold move on the one hand, and one of the most controversial issues of this period.. The cubic house can be considered as a symbol of the modern secular and western lifestyle (Bilgen, 2010:67).

Table 3. Effective Movements on the architecture of Turkey and Iran in the twentieth century. Source: authors.

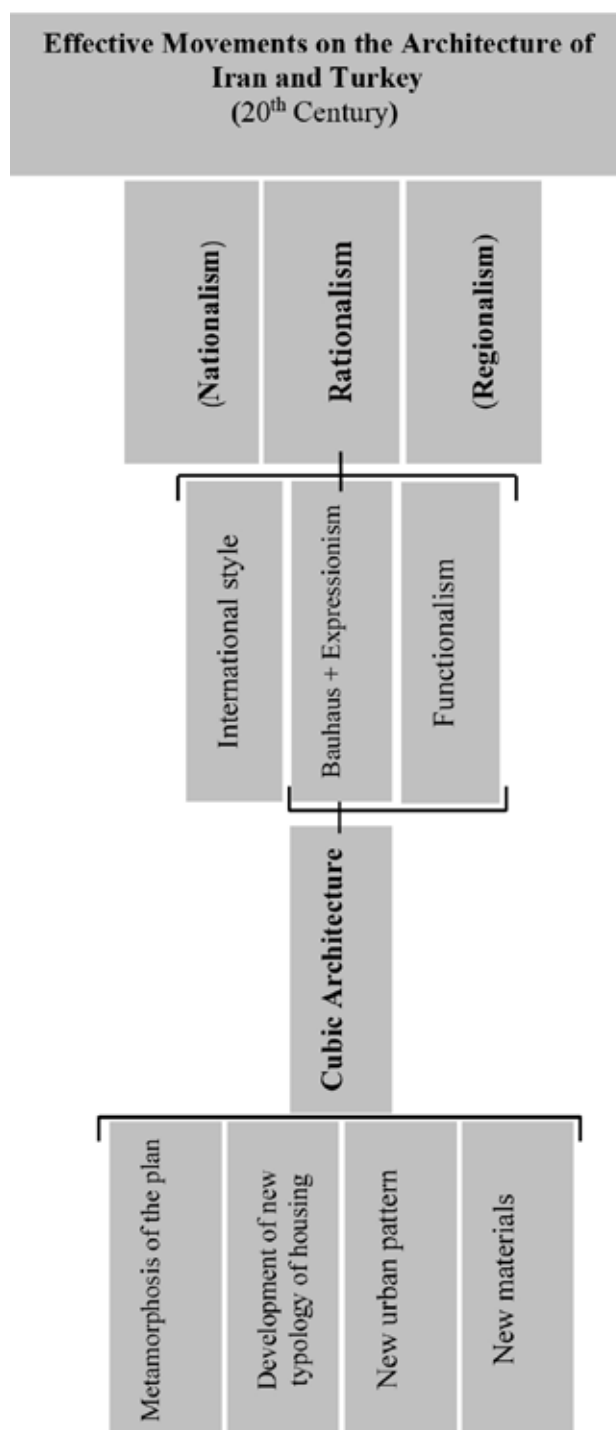


Table 4. Cubic Architecture Features. Source: authors.

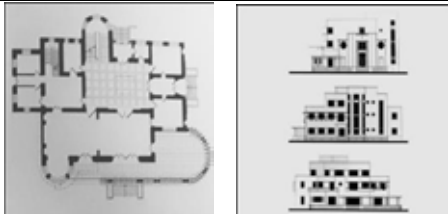

Cubic Architecture Features	Plan	<ul style="list-style-type: none"> - a Liber plan - Console canopy on the entrance - Glass surfaces in the interior - lofty interior spaces - non-symmetric - Combining the curved and orthogonal line in the plane - Extroversion - The central courtyard of traditional houses is rarely in the center of the plan - The Soffeh, structural element for organizing the plan - replacing the traditional courtyard with the open space and the semi-open - A terrace replace with the traditional ivan - Eliminating vestibule transition space
	Facade	<ul style="list-style-type: none"> - Cantilevers - Entrance Console Canopies - Cubic compositions of boxes - Geometric facades - Asymmetric compositions - Horizontal band windows - Flat roof - Balconies - Round Corners - Corner windows - Circular windows - Row windows - Nodecorations - Free façades
		<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Chankaya Palace, Halzmeister, Ankara</p> </div> <div style="text-align: center;">  <p>Sadabad Palace, Vardan, Tehran</p> </div> </div>
	Iran	Turkey

Table 5. Cubic Architecture Analysis, Chankaya Palace. Source: authors.


Building	Concepts	Components of the building							Description
		plan	Facade	Mass	Yard	Sofe	Ivan	window	
Palace of Mustafa Kemal (Atatürk), Chankaya, Clemenz Halzmeister	Tension	●	-	●	-	-	-	-	The plan is balanced and equaled, with a liber plan, spatial tension, and this tension or abandonment of symmetry in the organization and arrangement of open spaces in the plan.
	Harmony	●	●	●	●	-	●	●	Harmonies on the south porch, especially in the use of suspended columns on the porch, the facade of the winter yard, the rows of pillars round the courtyard, the vertical windows around the winter yard, the Colonnades around the building.
	Organize	●	●	-	●	-	-	●	The organization of the plan is formed around a courtyard, around this courtyard in the plan, mostly on the southern side are the functional spaces, and on the north side are most communication spaces and Colonnades.
	Transparency	-	-	-	●	●	●	●	Transparency in the plan, through elements such as windows, south porch and most importantly the middle winter yard as light sources, therefore, create transparency in the building, there is a kind of ambiguity and doubt about the use of transparency, semi-transparent volume.
	Continuity	●	-	●	●	-	-	-	The liber plan eliminates the hierarchy and transitional spaces of the traditional Turkish houses, thus creating space continuity, the use of colonades for the continuation of the interior space to the outside.
	Extraversion	-	-	-	-	-	●	●	Extraversion is related to two elements, first: Southern ivan, second: the colonades around the building, which is in contrast to the central courtyard on the plan, which increases the degree of introversion.
	Curved form	-	-	-	-	-	-	●	In the southern view, the underground has rounded windows
	Open space communication	●	-	●	●	-	●	●	Open space communication is divided into three categories: south Ivan, colonades around the building and the central courtyard, south Ivan and colonades are directly connected to the open space and the middle courtyard has an indirect connection with the open space.
Pictures									

Table 6. Cubic Architecture Analysis, Sa'ad Abad Palace. Source: authors.

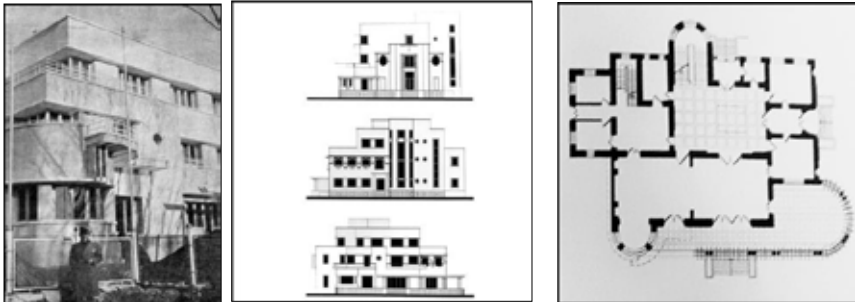
Building	Concepts	Components of the building							Description
		plan	Facade	Mass	Yard	Sofe	Ivan	window	
Palace of Reza Shah, Sa'ad Abad, Vardan	Tension	●	●	●	-	-	-	●	In the plan, asymmetry or tension, as well as the opening and closing of the interior spaces, there is no liber plan, due to the layout of the openings, there is a tension and rhythm in the face.
	Harmony	●	●	●	-	-	●	●	Harmony in the building: First in the Facades, which are most clearly visible on the eastern ivan entrance. Second in the plan, organize the uses and contradictory lines on the plan.
	Organize	●	●	-	-	-	-	●	The middle sofa is used as an element for organizing the plan, which is the center of organization for users, and Organize windows as a row in the facades.
	Transparency	-	●	-	-	-	●	●	At the center of the plan, there is a middle sofa that corresponds to the tradition of four-sofa houses in Iran , the only source of transparency are windows, the ambiguity and uncertainty of using transparency.
	Continuity	●	●	-	-	-	-	●	The hierarchy on the eastern front of the building: the yard, the stairs, the entrance porch, the corridor, the middle sofa. We see more space separation than continuity in the building. While on the south side of the garden, a kind of continuation and expansion of the garden into space.
	Extraversion	●	●	●	-	-	-	●	Exterior facade, numerous windows to the garden, the removal of traditional courtyards.
	Curved form	●	●	●	-	-	-	●	The remarkable features of the residential architecture of this period is Rounded Corner that we see in the terrace and the staircase, the Circular windows in the facades.
	Open space communication	●	-	-	-	-	-	●	South terrace and windows to the garden.
Pictures									

Table 7. Cubic Architecture Analysis, Residential apartment. Source: authors.

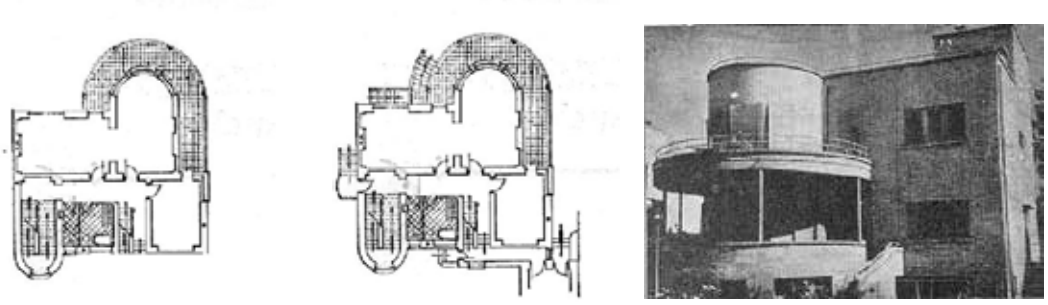
Building	Concepts	Components of the building							Description
		plan	Facade	Mass	Yard	Sofe	Ivan	window	
Residential apartment, Tehran, Ali Sadegh	Tension	●	●	●	-	-	-	-	In the plan, asymmetry or tension, as well as the opening and closing of the interior spaces, there is no liber plan, Considering the placement of the semicircle terraces in the facade, there is an asymmetric and tension in the facade.
	Harmony	●	●	-	-	-	●	●	Harmony Rows of terraced pillars on the southern side of the building, regular windows on the north and south facade, Regular combination of right-angled lines and curves on the plan.
	Organize	●	●	-	-	-	-	●	Planning is organized around a corridor. The linear Organizing of windows in the facade, organizing asymmetric vertical shaft in the plan.
	Transparency	●	●	-	-	-	●	●	In the center of the plan a corridor without light, more clarity in the walls, porch and wide terrace of the first and second floors.
	Continuity	-	-	-	-	-	●	●	Removal of the hierarchy of traditional houses, therefore, the continuity of the building with surrounding space, in the plans, with the location of the porch, we can see the continuity of the open space to interior.
	Extraversion	●	●	●	-	-	●	●	Extrovert Mass without central courtyard, wide windows on the facade, south porch with regular columns, so This building is extroverted.
	Curved form	●	●	●	-	-	●	-	The combination of a semi-circular terrace with a square plan in the southern view, semi-circular Vertical shaft.
	Open space communication	●	-	-	-	-	●	●	The porch and the terrace in the first and second floors, the row windows in the north and south facing the courtyard.
Pictures									

Table 8. Cubic Architecture Analysis, a Residential apartment. Source: authors.

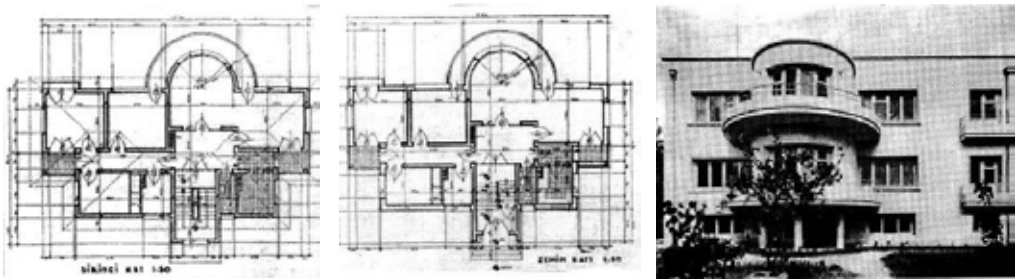
Building	Concepts	Components of the building							Description
		plan	Facade	Mass	Yard	Sofe	Ivan	window	
Residential apartment, Istanbul, Abedin Mortas	Tension	●	●	●	-	-	-	-	The asymmetric layout of the semicircular living space in the anti-center plan leads to tension in the plan, without a liber plan, the expansion and contraction of space on the plan.
	Harmony	●	●	-	-	-	-	●	The harmony in the north and south faces is completely opposite, so that on the north facade with the regular consoles of the terraces and in the south facade by emptying the terraces.
	Organize	●	●	-	-	-	-	●	Organize the plan around the central sofè, which is the center of organization for the users on the plan. Organizing windows in a row in a row, organizing asymmetric vertical shaft in the plan.
	Transparency	●	●	-	-	-	●	●	At the center of the plan central sofa, which is related to the tradition of Turkish houses, the central square is without transparency, with greater clarity in the walls and terraces of the floors, vertical shaft in the south view.
	Continuity	-	-	-	-	-	●	●	There is no hierarchy of traditional houses, so the continuity of the building with surrounding open space.
	Extraversion	●	●	●	-	-	●	●	Extrovert Mass without central courtyard, wide windows on the facade, The semicircular porch in front of the living space, so This building is extroverted.
	Curved form	●	●	●	-	-	●	-	Combine the volume of the semicircular in the plan, as the living space and the terrace on the northern front of the building.
	Open space communication	●	-	-	-	-	●	●	A spacious terrace in front of the living room, console terraces on the north and south facades, numerous windows facing the yard.
Pictures									

Table 9. Cubic Architecture Analysis, Fisherabad's villa. Source: authors.


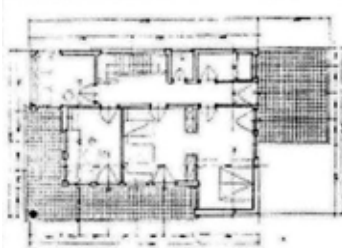


Building	Concepts	Components of the building							Description
		plan	Facade	Mass	Yard	Sofe	Ivan	window	
Fisherabad's villa, Tehran, Keyqobad Zafar	Tension	●	●	●	-	-	-	●	Asymmetric placement of stairs and semi-open spaces in the plan leads to tension in the plan, central sofe in the center of the plan, spatial expansion in semi-open spaces and plan plan.
	Harmony	●	●	●	-	●	●	●	By placing communicational spaces around and the corners of the plan, it is planned to form a four-sofa order in the middle space of plan. Varied and different windows are connected through a modular cement grid.
	Organize	●	●	-	-	●	●	●	The plan is organized around the central sofa, which is the center of organization for users on the plan. Asymmetric organization of vertical shafts in the plan, linear arrangement of the ivan on the south façade.
	Transparency	●	●	-	-	-	●	●	The Central sofe, central core without transparency, Due to the location outside the city, transparency is provided on the plan with free windows, a glass box suspended in the residential section.
	Continuity	●	-	-	-	-	●	●	The semi-open space of the porch on the ground floor is the continuum of the garden space in the building, the console cubes are transparent in the facade of a visual interconnection of the interior to the outside.
	Extraversion	●	●	●	-	-	●	●	Console glass cubes, multiple openings on the four sides of the plan, facing the garden and the surrounding area, directly connected to the garden space on the ground floor.
	Curved form	-	-	-	-	-	-	●	The Circular windows in the facades.
	Open space communication	●	-	-	-	-	●	●	A spacious porch in front of the living room, a glass cube in the south facade, numerous windows facing to the yard.
Pictures									

Table 10. Cubic Architecture Analysis, Suvadie villa. Source: authors.

Building	Concepts	Components of the building							Description
		plan	Facade	Mass	Yard	Sofe	Ivan	window	
Suvade villa, Istanbul, Seyfi Arkan	Tension	●	●	●	-	-	-	●	Tension in the distribution of semi-open and closed spaces, as well as expansion and contraction of space, without a free plan, a rhythm in the layout of openings.
	Harmony	●	●	●	-	-	●	●	Order in the villa facads, coherence in the uses and right-angled lines in the plan, regular openings.
	Organize	●	●	-	-	-	●	●	Planning is organized around a communication corridor. Organizing windows in a linear view, arranging asymmetric open spaces on the plan.
	Transparency	●	●	-	-	-	●	●	Plans with a central core without transparency, ambiguity, The concepts of transparency and ambiguity in the seyfi arkan projects are the concepts that he fluctuates between them.
	Continuity	●	-	-	-	-	●	●	On the plan: There is no hierarchy of traditional houses. Therefore, the continuation of the building with the garden space by placing the outer space(semi-open space) on the ground floor, especially with the use of ivan in front of the living room at the southern side.
	Extraversion	●	●	●	-	-	●	●	Multiple openings to the garden, the removal of the central courtyard of traditional houses, direct connection to the garden space through the ground floor and the first floor terrace.
	Curved form	-	-	-	-	-	-	●	The Circular windows in the facades.
	Open space communication	●	-	-	-	-	●	●	The first floor terrace and the south ivan facing yard facing to the garden.
Pictures	  								

Conclusion

The cubic house was seen as a manifestation of the modernization and westernization of the elite class, although the features of the cubic architecture were quickly adopted in the residential architecture of Turkey and Iran, but its ideological and political consequences continued to remain for decades. The aim of this study was to investigate the effect of cubic architecture on modern residential buildings in Iran and Turkey and comparative study of residential developments in the two countries in the early twentieth century. The assumption is that Turkish and Iranian residential architecture of in the early twentieth century were influenced by the cubic architecture. This hypothesis was approved by comparisons and studies and investigating the samples. In the comparative study of Cubic Houses in Turkey and Iran we can see main similarities on structure and architecture.. The results of this research and the detailed review of ? Table 11 show important points. First, the structural features of the cubic houses are independent and heterogeneous, multiple and non-linear narratives, universal, pseudo-modern, alien, incomplete, textured, rational, spatial, interconnected with tradition and experimental. Second, the structure of the organization in the plan is divided into four categories: Plans with a central offeh, an inner plateSoffeh, an external plateSoffeh and without plateSoffeh that have a mutual relationship with the traditional architecture of these countries. Third, the formal qualities of the cubic houses can be as follows: anomalous arrangement, round corners, round windows, terraces, flat roofs, the window in three corners, geometric view, extraterritoriality, row window, contrasting lines in the plan. From the differentiation aspects of this comparative study considering that the intensity of political and social fluctuations in Iran is milder in confronting with modernization and Western-Westernization, the cubic architecture in Iran is far more moderate and mellow in terms of its structure and form.

Table 11. Comparative study of cubic Architecture in Turkey and Iran. Source: authors.

No.	Building	Cubic architectural features																
		Open form	Liber plan	Asymmetrical organization	Extraversion	Center on the plan	Central sofe	Contradictory on the plan	Anti-center	Extensive terrace	Row windows	Circular windows	Corners Window	Flat roof	Rounded Corner	Geometric facade	Cube Asymmetric facade	No transitional space
1	Chankaya, Holzmeister	-	●	●	●	●	-	-	●	●	●	●	-	●	-	●	●	●
2	Sadabad Palace, vartan	-	-	●	●	-	●	●	-	●	●	●	●	●	●	●	●	-
3	Apartment, Ali Sadiq	-	-	●	●	-	-	●	●	●	●	-	-	●	●	●	●	●
4	Apartment, Mortas	-	-	●	●	-	●	●	●	●	●	-	●	●	●	●	●	●
5	Villa, zafar	-	-	●	●	-	●	-	●	●	●	●	●	-	●	●	●	●
6	Villa, Seyfi Arkan	-	-	●	●	-	-	-	●	●	●	●	-	●	-	●	●	●

Apartment, Ali Sadiq						Sadabad Palace, vartan						Chankaya, Holzmeister				
Extraversion	Transparency	Central sofe	Organizing	Continuity	Curved form	Extraversion	Transparency	Central sofe	Organizing	Continuity	Curved form	Extraversion	Transparency	Central sofe	Organizing	Continuity
Organizing the plan around the middle corridor, spatial, assymetrical and anti-center plan, the systematic organization of the windows in the facade, the flat roof, Extraversion, concrete and cement, the asymmetry in the facade, relationship with the tradition, Varied lines in the plan, independent & heterogeneous, unfinished, rounded corner, without ornament, multiple and non-linear, transparent.						Organizing the plan around the central sofe, spatial, assymetrical plan, the systematic arrangement of windows in the facade, flat roof, Extraversion, alienation, concrete, two-way relationship with tradition, the hierarchy of access to private spaces, transparent, the use transitional space into the entrance, circular window, rounded corner, independent & heterogeneous, Varied lines on the plan, without ornament, multiple and non-linear.						Liber plan, Organizing plan around the winter garden, Plan without central sofe, Spatial, assymetrical and anti-center plan, Regular arrangement of windows in the facade, Extraversion, the hierarchy of access to private spaces, Semi-transparent, Rounded window, Independent & heterogeneous, unfinished, without ornament, multiple and contradictory, Ambiguity.				
Villa, Seyfi Arkan						Villa, zafar						Apartment, Mortas				
Extraversion	Transparency	Central sofe	Organizing	Continuity	Curved form	Extraversion	Transparency	Central sofe	Organizing	Continuity	Curved form	Extraversion	Transparency	Central sofe	Organizing	Continuity
Organizing the plan around the vertical shaft, Spatial, asymmetrical plan, the systematic arrangement of windows in the facade, flat roof, rounded corner, Extraversion, the asymmetry in the facade, the layered facade, the hierarchy of access to private spaces, ambiguity, independent and heterogeneous, Unfinished, without ornament, multiple and non-linear.						Organizing the plan around the central sofe, spatial, asymmetrical plan, the regular organization of the windows in the facade, flat roof, Extraversion, alienation, the non-symmetric facades, the hierarchy of access to private spaces, transparent, Rounded window, independent and heterogeneous, varied lines on plan, without ornament, multiple and non-linear, varied windows.						Organizing the plan around the central sofe, spatial, asymmetrical and anti-center plan, the flat roof, Extraversion, the concrete and cement, the asymmetry in the facade, the relationship with the tradition, the hierarchy of access to private spaces, the contradictory lines on the plan, independent and Heterogeneous, unfinished, without ornament, multiple and non-linear.				

Reference list

- Akcan, E. (2012). *Architecture in translation: early twentieth century german-turkish exchanges in land settlement and residential culture*. Ph. D. thesis. Columbia University.
- Bilgen, D. (2010). *Against style: re-reading new architecture in early republican period in turkey*. Ph. D. thesis. Izmir institute of technology.
- Bozdoğan, S. & Esra, A. (2012). *Turkey: Modern architecture in history*. London: Reaktion Books.
- Bozdoğan, S. & Kasaba, R. (2000). *Rethinking Modernity and Identity in Turkey*. Seattle and London: Uneversity of Washington Press.
- Bozdoğan, S. (2001). *Modernism and Nation Building: Turkish Architectural Culture in the Early Republic*. Seattle and London: *University of Washington Press*.
- Burat, S. (2008). *The Changing Morphology Of Urban Greenways, Ankara, 1923-1960*. Ph. D. thesis. Middle East Technical University.
- Colomina, B. (1997). *Where Are We?. in Architecture and Cubism*. Cambridge: MIT Press.
- İmamoğlu, B. & Ergut, E. A. (2010). *Cumhuriyetin Mekanları. Zamanları. İnsanları*. Ankara: Dipnot Yayınları.
- Imamoğlu, B. (2010). *Architectural production in state offices: an inquiry into the professionalization of architecture in earl republican turkey*. Ph. D. thesis. Technical University of Delft.
- Janni Pour, B. (2001). *The development of the residential architecture of Tehran during Pahlavi era*. Ph.D. Thesis. Tehran: University of Tehran.
- Kanpinak, O. (1998). *Modernism And Dwelling: Residential Architecture in Early Republican Turkey*. Massachusetts: Massachusetts Institute of Technology.
- Madanipour, A. (1998). *Tehran: The Making of a Metropolis*. Tehran: Academy Press.
- Marefat, Mina. (1988). *Building To Power: Architecture Of Tehran 1921-1941*. Ph. D. thesis. Massachusetts Institute of Technology.
- Surushian, D. & Shafei, B. (2008). *Architecture of the vartan hovanessian*. Tehran: Did Publishing House.