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معماری بومی ایران در خوانشی نوین، از دههٔ چهل خورشیدی تا کنون
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Re-Reading Iranian Vernacular Architecture from a New Perspective from 1961 until Now

Marjan Arbabzadeh¹, Iraj Etessam^{2*}, Seyyed Majid Mofidi Shemirani³

1. Ph.D. candidate, Department of Architecture, Science and Research Branch, Islamic Azad University, Tehran, Iran.
2. Professor, Department of Architecture, Science and Research Branch, Islamic Azad University, Tehran, Iran.
3. Assistant Professor, Department of Architecture, Science and Technology University, Tehran, Iran.

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Abstract

Problem statement: The lack of identity and a sense of attachment to place and lack of attention to climate, nature and history have led modern architecture to face major problems. This has encouraged contemporary architects to search for solutions to fix the predicaments caused by modern architecture. This research is an attempt to understand how the integration of architecture, history and nature can offer a design that can satisfy today's needs while benefiting from advanced technologies.

Research objective: The purpose of this study is to find the key ideas in vernacular architecture by focusing on climate criteria that can be combined with new technologies. It is hoped that the ideas form the basis of contemporary concepts and pave the way for sustainable architecture. The possibility of examining the text of vernacular architecture from another perspective leads to the creation of a new language based on a direct reference to or a symbolic interpretation of the text. This is also another question to which the response can help us achieve the goal of this study.

Research method: The study is interpretive-historical and it is qualitative in nature. The data related to case studies were analyzed using the library method. Finally, a comparative approach was used to examine the similarities and differences.

Conclusion: The results indicate that contemporary architects have a vital role in developing the linguistic and contextual aspects of contemporary sustainable architecture. This requires understanding the main features of the vernacular-traditional architecture. In most of the cases studied, the initial designs of vernacular and traditional architecture have undergone fundamental changes in form and function during the transitional process and in many cases, the designs have gained symbolic features while responding to climatic issues. This has led to some kind of cultural and environmental sustainability. Also, the integration of advanced technology with vernacular and traditional content in some cases has made it feasible for architects to reflect the spirit of the times and create the modernist expression of the traditional concept.

Keywords: *Vernacular Architecture, Traditional Architecture, Climate Criteria, Sustainable Architecture, Ecology, Semantics.*

* Corresponding author: +989121256344, iragetessam@yahoo.com

Introduction and problem statement

In Iran's traditional architecture, buildings have been constructed in harmony and interaction with nature and the environment based on national-local culture and identity. The selection of form, materials and structure of the buildings has been based on the maximum use of natural elements (e.g. water, wind, soil and fire) and renewable energy sources. Architectural customs that have been generated over many years ensure the sustainability of traditional architecture. Modernism, with the idea of separation from nature and history and in the name of innovation, contrary to the traditional approach, formed the structures that created major environmental and cultural problems after several decades. It also resulted in the elimination of spatial and social identity.

However, all the achievements of modernism should not be neglected. It is necessary to reevaluate modernist ideals that have contributed to the formation of architectural movements in a contemporary period. Neo-traditionalism architecture is an approach that has gained popularity in contemporary Iranian architecture. Architects are attempting to study and analyze relevant architectural cases, their cultural content and forms and structural and decorative patterns to understand the principal features of Iranian traditional and vernacular architecture and use them in their designs. The application of these studies in developing designs of contemporary architecture is reflected in some work of today's architects. Neo-traditional architecture attempts to explain how to combine the values and historical traditions of architecture and the knowledge of vernacular architecture, which occasionally are integrated with advanced technologies, to address the challenges of modern architecture. In the authors' view, however, the optimal integration of this approach is under question because of the mismatches between the integration and the spirit of the times.

If we assume that modernity is being conscious of the needs of our time and addressing those needs,

then the major concern of this research will be the possibility of achieving a modern architecture that can meet the current needs or while influenced by traditional and vernacular architecture. This paper seeks to answer the following questions:

1. How can we integrate vernacular and traditional architecture to achieve a sustainable architecture in harmony with the spirit of contemporary times?
2. Is the modeling of vernacular architecture merely based on the form related to the linguistic approach or focuses on the content?
3. How can we establish a relationship between the language of modern and modernist architecture¹ and traditional and vernacular architecture?
4. How can we create a new language capable of regenerating the linguistic signs of traditional and vernacular architecture in the context of the contemporary architecture and to gain a proper understanding of today's audience and reach optimal efficiency?

The assumption of this study is that there is a possibility of achieving sustainable contemporary architecture based on reading vernacular and traditional architectural texts, utilizing its contextual knowledge and integrating it with new scientific achievements. This can be achieved by extracting its linguistic signs and presenting a new reading based on the spirit of the times and utilizing the modernity.

Literature review

Based on the objectives of this study, two main areas need to be examined: 1. research which has investigated vernacular architecture from environmental perspectives and climate sustainability and 2. research which has been conducted on contemporary Iranian architecture. Due to the necessity of having criteria for analysis and the classification of existing research on the climate problem, the important references used for selecting analytical criteria have been first reviewed. In a study by Koch-Nielsen (2006), the strategies for comfortable conditions using passive design principles have been detailed. In "Badkhan:

Molahezat-e Kalbadi-e Bad dar Sakhteman [Wind towers; Physical considerations of the building]”, McCarthy Consulting Engineers (2006) have identified weather and heat control, natural ventilation and wind tower design.

In their book, “Architettura popolare”, Alpago Novello et al. (2005) have examined the relationship between vernacular architecture and cultural, historical and social contexts. They have also examined the formation of vernacular architecture, its application and explained the relationship between vernacular art and architecture and the modern interventions in the creation of built spaces. In their book “Living with the Desert: Working Buildings of the Iranian Plateau ” Beazley and Harverson (2012) have discussed various topics such as materials used in this climate and their thermal properties and have scrutinized water resources and associated buildings (e.g. Yakhchal, Ab-Anbar and Qanat and finally, ponds, Asiab [Mill] and windmills).

In his book “Asayesh dar Panah-e Bad [Comfort in the Wind Refuge]”, Razjooyan (2014) has discussed the use of wind energy as a form of renewable energy. In “Des Architectures De Terre”, Dethier (2006) has offered a new approach to soil architecture.

In Iranian contemporary architecture, five books can be highlighted:

“Contemporary architecture of Iran” (Bani Mas’oud, 2011), “Theories and Styles in Contemporary Iranian Architecture” (Ghobadian, 2015), “Naqd-e Asari az me’mari-ye Mo’aser-e Iran [A Criticism into Works by Contemporary Iranian Architecture]” (Naghsh-e Moheet Consulting, 2008), “Sharh-e Jaryan-ha-ye Fekri-e Me’mari va Shahrsazi dar Iran-e Mo’aser [A Description of Intellectual Streams in Architecture and Urban Development in Contemporary Iran]” (Habibi, 2006) and “The Advent of New Architecture in Iran” (Bavar, 2009). These books are the primary basis for the study of contemporary works in this research, these works have been assessed in the next sections from

the perspective of environmental sustainability and climatic criteria and simultaneously from the perspective of linguistic features (to reach contemporary architectural language). The analysis of the works from these two aspects is the contribution of the study and, to our knowledge, there is no report on the classification of the works based on climatic-linguistic criteria. Considering the spirit of contemporary times that can be reflected in the form of advanced technologies has also added to the originality of this research.

Theoretical Foundations

Contemporary Iranian architecture cannot be separated from the modernist influences of Western architecture. The first reflection of modernism in Iranian architecture and urban design dated back to 1877 to 1878. Later, the influence of modernism emerged between 1931 to 1941 and 1961 to 1978. In this period, modernization and cultural traditions and values received much attention. Modernization, Neo-traditionalism, ecologism and expressionism were introduced into the architectural context. These streams are summarized in Table 1. Though, we have focused on the last two periods (i.e. between 1961 to 2001) in this study, Table 1 does not contain information since 2001 onwards.

The main features of architecture during the last two periods. from 1961 to 2001 (See Table 1), can be summarized as follows:

- Considering Iran’s historical and vernacular architecture
- Using traditional materials for the building’s structure and decoration
- Updating vernacular architecture
- Integrating past and modern architectures
- Considering the cultural and social contexts and the rules of historical or vernacular architecture
- Consciously using past architecture and updating it with new techniques

Proponents of recreation and revitalization of the values of vernacular and Iranian architecture includes ecologists and neo-traditionalists. Influenced by

Table 1. Streams of thought influencing the Iranian contemporary architecture. Source: authors.

Historical period	Dominant tendency	Main streams	Secondary streams
1877 to 1896	The first modernism is reflected in Iranian architecture and urban design		
1931 to 1941	The first and second modernism echoes		
1961 to 1978	Unidirectional modernization (top to down)	Modernization Neo-traditionalism Expressionism	Originalism Traditionalism Historicism
1981 to 2001	Double-sided modernization	Modernization Post modernism	Ecologism Structuralism Modernization Postmodern realism Neo traditionalism

European modernist architecture in the 1960s, this group of architects aimed to investigate the values of vernacular architecture and used the metaphorical nature of Iranian expression in creating their architectural works. They also attempted to achieve environmental sustainability. Architectural works created by this group can be considered as the first post-modernist works of Iran, which more or less reflect a modernist aspect of ancient concepts of Iranian architecture (Habibi, 2006, 38). Generally, since 1941, a nostalgic approach to forms, such as formalistic inspiration from the past architectural forms or conceptualized expression of the past architecture, can be seen in the designs of some contemporary architects (Shayan & Me'mar Dezfouli, 2014, 10). Indeed, the concerns of Iranian intellectuals in the 1960s and 1970s (e.g. "Jalal Ale-Ahmad", "Ehsan Naraghi" and "Dariush Shaygan") were a kind of cultural affinity. Also, architects sought to gain "ownership for architecture". What known as "own-architecture" at this time is nothing more than modern architecture with a tendency toward ecologism. Ecotourism and, consequently, historicism, had a wide and dynamic meaning for these architects. In the broadest sense, ecologism was thought of restoration, or continuation of vernacular customs, beliefs and cultural values and

included a naturalistic view that leads to sustainable architecture. The tendency of this group of architects towards historicism and ecologism came not through the theoretical teachings of postmodern scholars (e.g. "Robert Venturi" and "Charles Jencks"), but through the theories and works of "Louis Kahn", "Hugo Alvar Henrik Aalto", "James Stirling" and theories discussed by Fathi in the book "architecture for deprived people" that is his most important work in the Egyptian new Quarna (Bani Mas'oud, 2011, 297). This tendency toward ecologism and naturalism and ecological perspective can be found in the works of some Iranian contemporary architects.

Moreover, the semiotic aspect of historical architecture that has been used in the assessment of works necessitates reviewing the view of prominent theorists of semiotics. Swiss linguist "Saussure" and "Pierce" (his contemporary American philosopher), are the main founders of semiotics. Saussure proposed a double-side pattern of the sign explaining that the sign is made up of a signifier and a signified and the sign is a whole resulted from the bond between the signifier and the signified. But Pierce proposed a triple-side model including representation, interpretation and subject and argues that the interaction between representation, subject and interpretation is "symbolic"

(the whole of the meaning process). “Roland Barthes”, the most prominent figure proposed the semiotics of referentiality, differentiate an indicative referentiality by referring to the direct semiotic relationship between the signifier and the signified and the implicit referentiality by referring to the construction of a more complex sign, in which the sign which contains the signifier and the signified, acts as a signifier to another signified. Another view has been proposed by “Umberto Eco” using Saussure and Pierce’s opinions. His view is based on behavioral, historical and social roots for meaning and interpretation. He argues that referentiality encompasses all cultural phenomena and defines semiotics as a science that deals with the communication, reading and interpretation of socio-cultural aspects of life.

Thus, according to the semiotics perspective of Barthes and Eco, architecture, is, undoubtedly, of particular importance in semiotics for serving its referentiality function and for being a cultural phenomenon (Bagheri & Einifar, 2016, 2-3). There are other theorists and philosophers, including Martin Heidegger, who indicate that “artwork” is something more than “objectivity”.

The artwork is “sign”, indicating what that is “absent”. The artwork is a sign, a guide, a symbol and more (Noghrekar, 2010). Kandinsky emphasizes the hidden meaning of some symbols and patterns, most of which are silent, but it is the silent spirit that gives it a meaning and significance. According to Guenon, man needs a symbol to gain an understanding of superior concepts with the help of something closer to his/her sensory perception. Ardalan believes that the symbol results in human being evolution and Eliade regards it as a splitter of the world. Schultz highlights the concepts related to the building. According to him, the concepts include three parts, representation, complementarities and symbolization, offering a sense to the building and they present the aspects of the overall process of deployment. He believes that architecture needs symbols and considers symbolization a necessity (Torabi & Asadi, 2016; 261-263). There are various




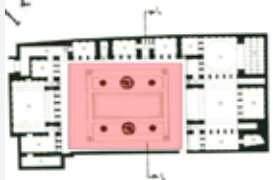






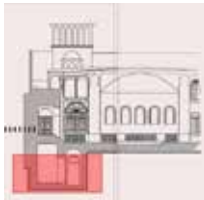
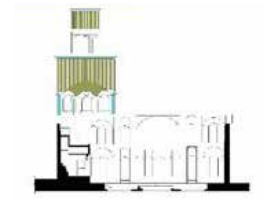










types of symbols such as historical symbols that are rooted in history and this is a history that is capable of expressing them thematically and their semantic interpretation is not feasible excluding historical reference and historical (postmodern) architecture cannot be examined independently from semiotic expression.

• **A contemporary reading of vernacular architecture (ecologism and historicism in contemporary architecture)**

Vernacular architecture can be traced back to some cases of contemporary architecture associated with postmodernism. Vernacular architecture can be studied from different perspectives. Research on form, structure, materials, methods of environmental regulation and relation to nature, construction approaches, decorative motifs and the use of local labor has resulted in cases of contemporary architecture characterized by its environmental sustainability, interaction with nature, history and cultural identity. Only some of these features have been included in the present work and used as criteria in the comparative study. The reason is that the features are large in number. In many cases of traditional and vernacular architecture, such as the Lariha House, the Rasoulia House, the Aghazadeh House in Yazd and the Tabatabai House in Kashan, we can realize that climate issues have been the concern of many and this concern has been reflected in the form of design solutions such as developing a centralized spatial organization (around a voidplace), creating microclimate, optimizing the use of sunlight and heat based on the migration pattern of Yaylak and Kishlak, utilizing materials of high heat capacity, digging the ground (designing earth sheltered houses) and designing specific physical components such as windcatcher, domes, Iwans, etc. These solutions have been used for understanding the architectural form and function (i.e. focusing on functional and semiotics features) in contemporary architecture (Table 2).

Understanding the physical structure of vernacular architecture is of particular importance. The forms

Table 2. Criteria driven from the vernacular architecture. Source: authors.

	Borujerdi House, Kashan	Lariha House, Yazd	Rasoulia House, Yazd	Aghazadeh Mansion, Yazd
Central yard pattern				
Micro climate				
Materials	Brick (as main material)	Brick (as main material)	Brick (as main material)	Brick (as main material)
Earth Sheltered spaces				
Formative-climatic elements and parts	  	  	 	 

and components used in the body of vernacular architecture can be the source of inspiration to develop the functional-climatic aspect of architecture. It can also serve a semiotics function in the contemporary architecture language (i.e. a reference for semiotics-based reading in the creation of contemporary

architectural works). This approach is adopted by Kamran Diba and can be seen in his works at the Tehran Museum of Contemporary Art. Elements and forms of Iranian vernacular architecture have been displayed in the Tehran Museum of Contemporary Art project. Understanding the physical structure of

the windcatcher as an important element of Iranian vernacular architecture, especially in hot and dry areas, has been accompanied by the transformation of the architectural form and function (i.e. converting it into a light well and a key element in natural light supply) and gained special attention in the main appearance of the complex. The use of a light well with a windcatcher-like form in the design of the Mosque of Ahvaz Jundishapur University of Medical Sciences (AJUMS) (1968) is another Diba's work. As noted above, the adopted forms have been used to serve the new functions. Therefore they have become different from the original forms. This means that they have provided a new reading of the old text that is thinkable and far from superficial imitations. Another case of - modeling inspired by the physical structure of previous architectural work can be traced in the work of Farhad Ahmadi in the project of Dezful Cultural-Cinematic Center. The barrel vaults, domes, windcatchers, central courtyards and water ponds are the symbols of the historic monuments of Dezful. In this building, Rasmi Bandi (decoration method) under the dome of Isfahani style is constructed on the floor and semicircular vaults have been used instead of barrel vaults (Ghobadian, 2015, 311).

It seems that the architect has established a semiotic relationship with the vernacular architecture in this project. The functional aspect and the windcatcher-like form and the other shapes are words originated from the ancient Iranian vernacular architecture text. Another case is the desert house by Firouz Firouz. As a key element, Iwan controls the sunlight on the south wall. In this case, this formative-physical interpretation is more functional. Lattice walls and soffits in the inner courtyard are physical elements that have been considered in the design of the Shushtar new town and have a special role in controlling sunlight. The dome with its formative characteristics regulating optimal environmental conditions, especially in the desert climate, is apparent in houses designed by Nader Khalili Elhami.

In some cases, understanding the physical structure

of vernacular architecture has finally been partially extrapolated from the fully functional-climatic aspect to the allegorical aspect, leading the building to act as a sign of ancient heritage of Iranian vernacular architecture at the urban scale.

Spatial organization in traditional and vernacular architecture as a climatic factor can be used to analyze contemporary architectural works inspired by vernacular architecture. Actually, the small and deep courtyard is an excellent thermal regulator in hot and arid climate. Its small size and special proportion create shaded space during the day and decrease thermal impact and more heat dissipation from surrounding indoor spaces. Thus courtyard act as passive cooling (Heidari, 2010, 25-26). Spatial organization around the central courtyard is a well-established means of organizing in Iranian vernacular architecture. In many Iranian buildings, it seems that the designer first has considered the central courtyard and its proportions and then organized the various spaces around it. The courtyard of houses, mosques and schools and caravanserai are shaped in this way. The yard organizes the spatial elements in the designs (Kasraian & Afshar Naderi, 2002, 17). In other words, a centralized organization with a centralized, void space is among major features in many cases of traditional Iranian architecture. The space, its proportions and geometric features are carefully determined. In contrast, the expressionism puts the main volume of the building at the center. The spatial organization design which centralizes a void space can be found in the Shushtar new town (another work of Kamran Diba) emphasizing traditionalist view and staying far from modernity. The central void space plays a major role in organizing the houses of this town. The central courtyard with its irregular shape is also of particular importance in the spatial organization of the Tehran Museum of Contemporary Art, where the courtyard is elongated in the north-south direction, i.e. perpendicular to the museum's entrance axis. There is a small squared-shape pool in the central point just over the main axis of the yard. Several galleries are organized around this void central

space. There is also a connection between the main hall and its lower floor. This powerful connection is formed by the central void space surrounded by the ramp. At the lowest surface of this void space there is a small pool that completes the structural pattern of the central void space (Bani Mas'oud, 2011, 435). As discussed earlier about the physical structure criteria, Diba's interpretation of traditional architecture in the museum is innovative not a mere copy. This is indicated by transforming the central courtyard into a voidspace on several levels. There is also an octagonal and a squared courtyard at the entrance of the complex, forming the basis for the complex's main organization. Other cases are the buildings of the Iranian embassy and Iran's ambassador's residence house in Seoul. In International cultural center of Isfahan, in the work of Farhad Ahmadi, some of the spaces like teahouse and basin organized around a central octagonal space which is as high as a three-floor building. There are three central courtyards on three levels, which are the main spaces in the seraglio part organization. In these three buildings, the inner courtyard acts as a garden ditch to shape the spatial organization of the complex.

Another case of transformation of the central courtyard pattern can be found in the Sharifi-ha House project designed by Alireza Taghaboni. A central void space is an essential part of the spatial organization of the home and allows the natural light goes through when the front moving rooms are closed out. This project can be one of the innovative understandings of concepts, patterns, organization and features of traditional and vernacular architecture. Other aspects of this plan will be examined following other criteria.

The creation of microclimate is another concern of traditional and vernacular architecture that has a close relationship with past climatic criteria. Creating a microclimate with relatively humid weather in the heart of the burning desert is an innovative strategy of Iran's ancient architecture. In the design of a desert house by Firouz Firouz, the outside air, which is composed of natural humidity

of water and plant, enters the building after passing through the foraminate surface and void space. Thus the stream of cool and humid air is formed to create a microclimate in the heart of the desert. Another interpretation of solutions to this climatic criterion can be found in the new Shushtar town project. The use of water and plants in the inner courtyard with proportions that allow for shading in the hot hours of the day along with covered and shaded passages, offers a microclimate with optimal weather (ibid., 454).

Construction materials are another climatic criterion of vernacular architecture. Brick and tile are prevalent materials used in vernacular and traditional architecture. The use of land and soil as the main construction materials is characteristic of vernacular architecture, particularly in the hot and dry region of Iran. Khalili considers this aspect of vernacular architecture as a model in his architectural designs. The use of soil in Khalili's works is not only referring to the utilization of ecological materials, but also to the regulation of environmental conditions and the use of nature to achieve comfort. The formation of thermal mass using thick cob walls is necessary for achieving comfort without mechanical energy dependence. Khalili's designs are a combination of traditional materials with modern technology in the form of innovation. Khalili, like Fathi, tends indeed to revive traditional structures. The use of clay and mud as cheap materials is a common feature of these two nationalist architects interested in reviving traditions. The "Ceramic Houses" method takes a new step forward by fully recognizing and adhering to the traditional "brick and flower architecture" of Iran. Ceramic house is indeed a combination of Iranian soil architecture and pottery (ibid., 334). Due to the vulnerability of clay houses to water infiltration and earthquake, Khalili innovated an international method that would not only solve these problems but also is independent of location (Ghasemnia & Soltanizadeh, 2016, 45). Ceramic house is a method developed by Khalili based on firing and baking of flowers, which is used to reinforce the buildings

and leading to the widespread distribution of dome-shaped structures with greater resistance to water and earthquakes. In the new Shushtar town, brick has also been used as the principal material mainly due to its climatic features. The desert house of Firouz is another case indicating the use of brick walls and pottery pots in the roof due to the climatic features of materials such as thermal mass creation and thermal insulation. Another case is the Dezful cultural-cinematic center. Integrated exterior brick facade combined with white sarooj sections. The materials are combined in places with turquoise and azure tiles to form knots. In this case, the symbolic representation is accompanied by the climatic character of the materials (*ibid.*, 331). Among the cases reviewed, vernacular materials are commonly used in the work of Nader Khalili, Desert house and new Shushtar town. Moreover, the traditional materials used in the other sample have a symbolic and decorative aspect, besides functionality.

The optimal use of sunlight and heat is another climatic feature inspired by the principles of vernacular and traditional architecture. The optimal use of solar heat or, in other words, keeping the interior area away from unwanted solar heat in the summer or the warm hours of the day and the utilization of solar heat in the winter or radiators in the early hours of the day along with natural light supply leads to a variety of architectural solutions in the vernacular and traditional architecture. What Iranians and particularly the residents of desert, have come to realize is that the rooms located in different parts of the courtyard are not exposed to the same heat and sunlight. In many cases of traditional architecture, the south-east direction is best to absorb sunlight in winter and summer. The southwest-facing rooms are only useful in winter but they are unsuitable for summer. The rooms can only be used in summer if they have big Ivans in front elevation to prevent sunlight in summer. The northeast places are protected from the solar heat in the summer and do not have much exposure to sunlight, but they are very cold in the winter (*Tahbaz, 1995, 85*).

Accordingly, a traditional approach was developed to vernacular and traditional architecture considering the necessity of keeping the weather cool in summer and its warmth in winter while making sufficient use of natural light through the division of spaces into summer and winter residents and the seasonal migration pattern. This solution is clear in all four historical cases cited at the start of this section. An innovative understanding of traditional and vernacular architecture based on this approach can be found in the Sharifi-ha House designed by Alireza Taghaboni. This work has already been assessed by another criterion. In some contemporary projects (e.g. Sharifi-ha House), the integration of modern technology with ideas inspired by traditional and vernacular architecture can be seen more clearly. At first glance, the manifestation of advanced technology can be deemed as the main feature of the house's landscape. Whereas, after examining the spatial organization and association of spaces with natural elements such as natural light, traces of vernacular architecture can be found as well. The house has seven stories with three rotating 90-degree rooms that allow residents to experience a variety of spatial arrangements, with optimum use of sunlight and heat at different times of the day and in different seasons. The house consists of three main sections including the fixed section (front and back rooms), a central void between them allowing natural light to enter when the front rooms are closed and the moving section (*Nejadriahi, 2016, 777*).

The moving part offers full façade transparency and maximizes the use of natural light and solar heat. This section can, simultaneously, rotate around the vertical axis to change the degrees of transparency until it is fully closed. The ability to fully control the light and solar heat are evident. The pattern of seasonal and daily migration has been transformed by flexible surface design and this creativity is inspired by a modern reading of the principle of optimal use of solar light and heat in traditional and vernacular architecture. In other words, moving some of the spaces structurally as the main feature

of this house is a manifestation of contemporary advanced technology and this provides an innovative understanding of the traditional model. So in this design, the main ideas of traditional architecture in combination with modern technology and accordance with contemporary needs are evident. Climate is also the main basis of design in the design of the desert house designed by Firouz Firouz. The optimal use of sunlight while avoiding excessive heat has influenced the specific design of the house surface. The façade form of the house is determined by the calculation of the solar radiation path. The porous outer façade controls sunlight and provides some natural light. The roof in the south also gives a deep shadow to the wall. On the other hand, the designer tries to create low-cost insulation through trapping large volumes of air under the inverse pots (Bani Mas'oud, 2011, 354). Creating space underground (designing earth sheltered) is another solution that is considered relevant to the climate criteria in the study of works. Soil sheltering is a solution that has been developed in vernacular and traditional architecture, aiming to control heating and cooling and preventing severe daily and annual temperature fluctuations (especially in hot and dry climates). In the Tehran Museum of Contemporary Art, space is designed in the form of Iranian architectural vaults in the center of the museum and at the lower level, in the middle of which there is a small pool similar to the Iranian ponds. This gradual dipping of the building at the heart of the earth, which occurs along the main ramp, is reminiscent of sheltered spaces in desert towns. The gradual dipping of the exterior volumes and the numerous skylights and closed and low-porous walls make the façade of the house more or less similar to the houses in traditional cities (especially in hot and dry climates). At Dezful cultural-cinematic center, the structure is also centered on a spiral and spinning path that starts with the movement of water from a squared courtyard to the ground level, rotating through a transparent inverted cone and finally reaching to an octagonal courtyard on a circular

slope. This movement from the surface to the deeper level has also a symbolic and allegorical form and, with some ambiguity, tells the story of passing from the physical world to heaven, besides the functional aspect and regulation of thermal conditions (ibid., 434). In the building of the Iranian embassy and the ambassador's residence in Seoul, there is also the creation of a garden ditch in the main building of the main space at the spatial organization of the three lower floors of the building. Employees reach the embassy from inside the basement parking lot by climbing up a deep, dark space elevator through a fountain to the middle of the garden ditch surface and then to the ground floor. In the ambassador's residence, a garden ditch also forms part of the surrounding earth-sheltered (ibid., 440). Space in the heart of the ground can also be found at the Sharifi-ha house. It should be noted that in the second case, i.e. the movement from the surface to the depths and spaces dipping into the earth is based on symbolic expression, besides climatic aspects.

Research methodology

This theoretical and applied research was carried out based on a mixed approach, in particular and a qualitative approach, in general. There is a high similarity between historical and qualitative research. In both cases, the researcher aims to gather data needed for the analysis of a complex social-physical phenomenon. This process requires searching, collecting and organizing documents, as well as evaluating and forming a holistic and credible narration where data interpretation is both critical and most important. In other words, in interpretive-historical research, the researcher studies a phenomenon in the past, while qualitative research examines the complex social-physical phenomena in contemporary times (Grout & Wang, 2007, 136-137). In this study, the historical and contemporary samples were used in combination. Finally, the case studies were classified according to similarities and differences using a comparative method. The data were collected using the library method and

the case studies were selected from contemporary architectural works based on the similarity of the criteria investigated using vernacular and traditional architectural features.

Findings

In this section, a diagram is drawn based on the criteria examined in contemporary architectural works inspired by traditional and vernacular

architecture (Fig. 1) (See “Theoretical foundations”). Then the architectural works reviewed in the previous section are presented in Tables 3, 4 and 5 based on these criteria and the analytical figures and texts associated with each work are provided in the tables. The works were classified based on common features and their differences from the criteria are shown in Fig. 1. These tables are based on the comparison of the works with the above criteria.

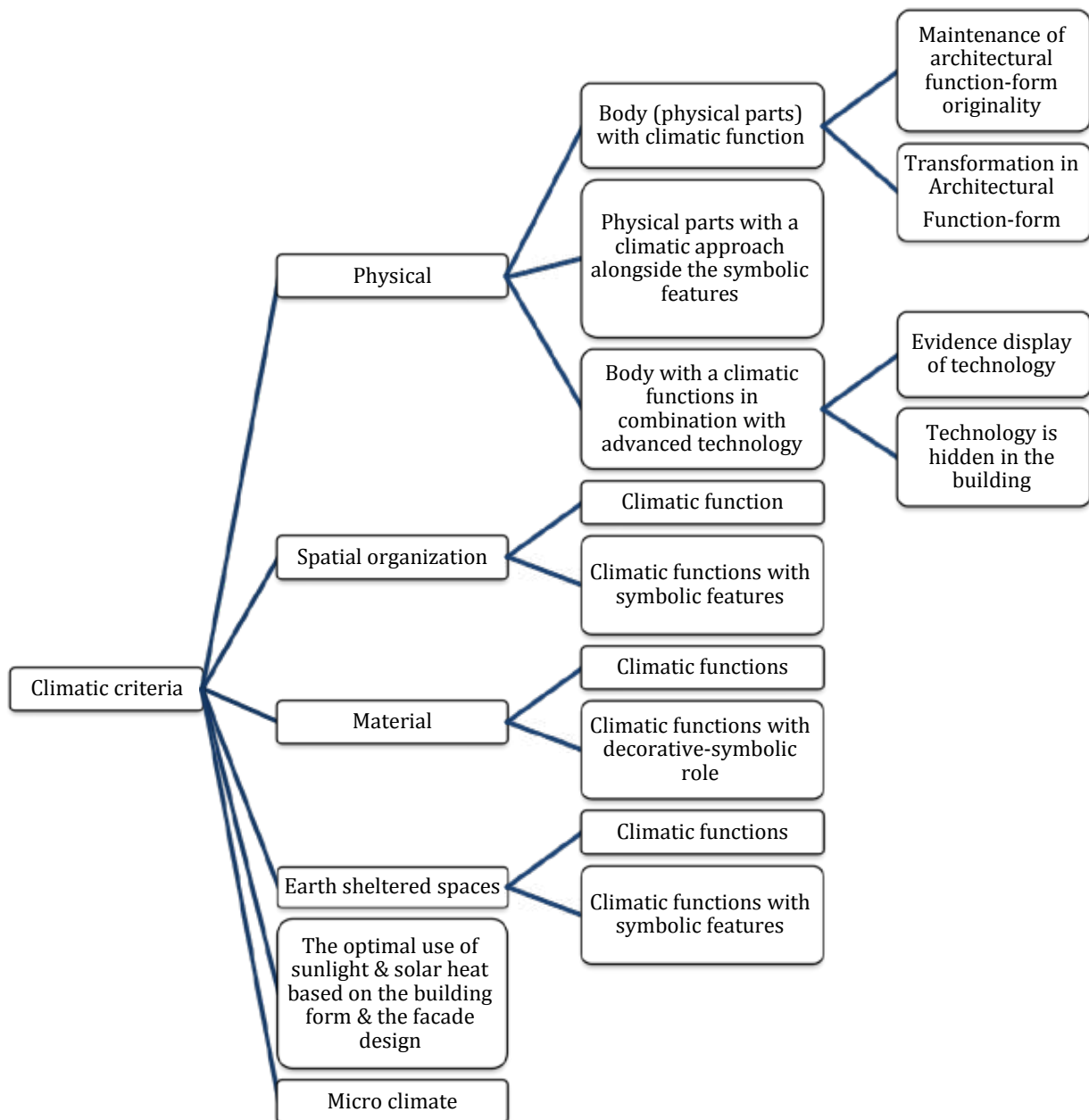


Fig. 1. Criteria included in the analysis and criticism of contemporary architectural works driven from the vernacular and traditional architecture. Source: authors.

Discussion and Conclusion

Based on Tables 3, 4 and 5 provided in the “discussion” section, all the samples investigated can be categorized under sustainable architecture with an environmental approach, at first glance. All of these cases are designed to respond to climatic

conditions and they have been developed based on an initial understanding of traditional and vernacular architecture and transform it into a concept, while in a limited number of works (e.g. new Shushtar town), early patterns have not considerably undergone a fundamental change in function, form and content in

Table 3. Classification of case studies based on climatic criteria considering the building’s body. Source: authors.

climatic criteria considering the building’s body				
Body (physical parts) with a climatic function		Physical parts with a climatic approach alongside the symbolic features	Body with a climatic function in combination with advanced technology	
Maintenance of functional-formative originality	Functional-formative deformation		Evident display of technology	Technology is hidden in the building’s body
<p>Dome in houses designed by Nader Khalili, retained it’s original form. The specific formal character of dome has minimized the radiation absorbance in hot and arid climate.</p>  <p>Light controlling elements in Shustar new town (latticed surfaces in the façade that let controlled light go to back facades) alongside semi-open spaces with vault-like parts in external façade. These elements retain their original form and function.</p> 	<p>Windcatcher in the Tehran Museum of Art Works has been converted to the light well and underwent functionalchanges .</p>  <p>The original form of a wind catcher is changed in Dezful cultural-cinematic center. The ornamental surface on the top (roof) of the wind catchers has been created by cutting the original rectangular cube form of it (transformation of the form).</p>  <p>The design of a wide and deep Ivan in southern elevation that causes a deep shadow on the clear surface. The Ivan has been deformed.</p> 	<p>Wind catchers in the Tehran Museum of Art Works. These wind catchers are a symbolic expression of roofs in desert areas.</p>  <p>Dezful cultural-cinematic center and four wind catchers around a garden that symbolizes heaven. These wind catchers intensify attention to the sky as the paradise. Consider building in connection with the four elements of nature (air, fire, water & soil), is the main symbolic feature of the design.</p> 	<p>There are three steel bridges in Iran’s embassy in Seoul, which are all covered by a glass and a metal sheet, just top of the four concrete keeps. The building façade is also of concrete materials.</p>  <p>In International cultural center of Isfahan, There are several transparent suspended bridges with steel material and a concrete dome with structural element which create a modern technological features in combination with traditional aspect.</p> 	<p>The use of steel fastenings inside the layers of soil bags in the dome of Nader Khalili houses. This technological feature is hidden in the building’s body.</p>  <p>In Dezful cultural-cinematic center, a major part of the building has been under the earth, while covered by a huge volume of concrete. The building structure is composed of steel and concrete, and the roof of the halls is based on precast slabs. The majority of the elements have been hidden under the traditional façade of the building.</p>  <p>The concrete structure is hidden under the brick façade of a desert house</p> 

Table 4. Classification of case studies based on climatic criteria considering the spatial organization and type of materials. Source: authors

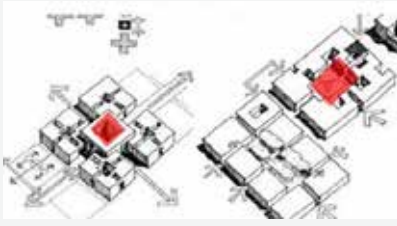

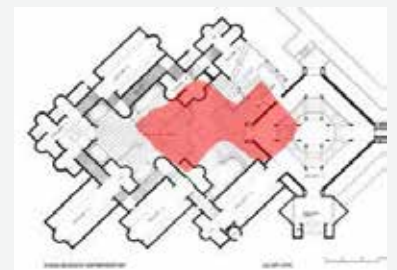
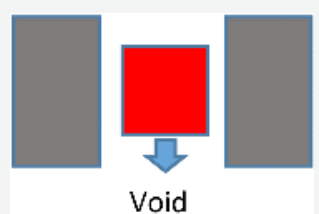



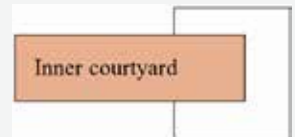

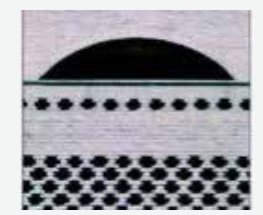

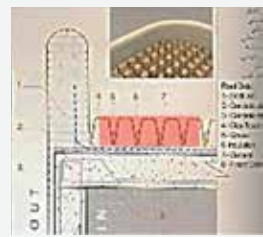



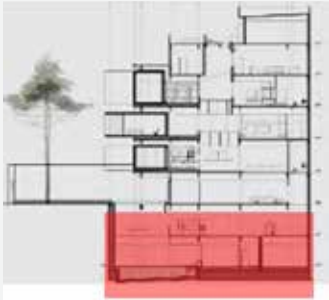
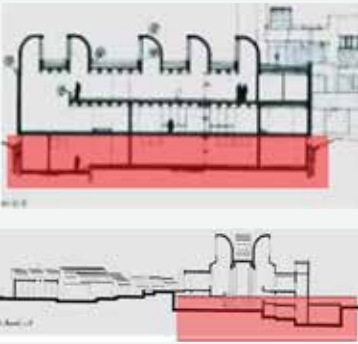


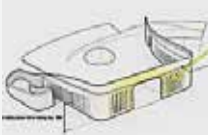


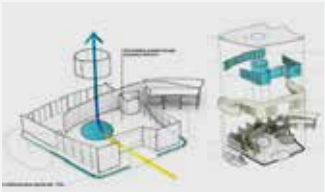

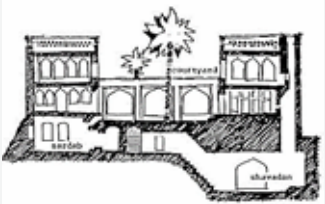
climatic criteria considering spatial organization and type of materials			
The spatial organization based on the inner courtyard		Materials	
Climatic function	Climatic function with symbolic features	Climatic function	Climatic function with decorative-symbolic role
<p>Inner courtyard in spatial organizing in Shushtar houses</p>   <p>Central courtyards as the principal element in spatial organization of Tehran Museum of Art Works</p>  <p>Central void space in Sharifha House inspired by the concept of the central courtyard providing natural light</p>  <p>Central courtyard with a pool in addition to a northern clear surface providing natural light without producing any excessive heat in the desert house</p> 	<p>Inner courtyard in Dezful cultural-cinematic center</p>  <p>In Iran's embassy in Seoul, the central courtyard with clear roof, walls and floor serves as an energy source in summer and provides natural light in the earth's depth plus a symbolic representation of generation and ascension</p>  <p>In the squared plan of the ambassador residence in Seoul, the central part is void and decorated with a springhouse that is a religious space gathering light, water, wind, and fire. Space is supplying natural light as a garden ditch.</p> 	<p>Brick as the main material in new Shushtar town having climatic feature created by the heat mass (thermal mass)</p>   <p>Brick wall as a surface with climatic function besides the use of inverse clayish pots with air trapped under it.</p>   <p>In houses designed by Nader Khalili, the soil is a major material in the form of a superadobe that controls high thermal fluctuations with its high thermal capacity (thermal mass).</p> 	<p>Integrated brick façade is decorated partially with turquoise tiles</p>  

Table 5. Classification of case studies based on climatic criteria. Source: authors.

climatic criteria considering other approaches			
Delving into the earth (the design of earth sheltered)		The optimal use of sunlight and solar heat based on the building form and the design of outer - façade	
Climatic function	Climatic function with symbolic features		The creation of a microclimate
<p>The design of the basement is an earth-sheltered to partially respond to the climatic issues in the design of Sharifiha House.</p>  <p>In the Tehran Museum of Contemporary Arts, the circular closed space of the museum guides the person gradually toward the deep layers of the earth.</p> 	<p>The structure of Dezful Cultural-Cinematic Center design is based on a rotating and spiral path starting from the squared courtyard at the ground and ending to an octahedron courtyard in the depth. This is a symbolic representation of passing from the mortal world to heaven.</p>  <p>The garden ditch in the ground is one of the spaces in Iran's embassy in Seoul and the residence of Iran ambassador Besides climatic functions, the spaces are a symbolic representation of the heaven path from the ground darkness towards the empyrean through water and sky.</p> 	<p>The special design of the building façade is based on sunlight radiation direction. The design of a space between the outer skin and inner functional spaces create a microclimate behind the external lattice surface.</p>   <p>Mobile box-like forms in the main façade serve as an element regulating environmental conditions (light and heat) as well as a new reading of Kishlak and Yaylak in summer and winter, and seasonal migration to the traditional houses</p> 	<p>The creation of a central space between façade and inner space helps to optimize the use of the humidity of natural water and plant alongside the airflow direction passing through the façade's pores to create a microclimate.</p>  <p>The proportions central courtyard creates cool and shaded space in summer. Trees and plants are used to create a microclimate in new Shushtar town</p>  

the process of becoming a contemporary concept. It is evident that in most of the cases studied, first patterns have undergone structural and functional changes fundamentally during the transitional process and many cases have developed some symbolic features while responding to climate issues. Examples include the Tehran Museum of Contemporary Art, whose

wind catcher transformation in the transitional process is discussed in Table 2. Thus, in some cases, buildings have lost a purely materialistic aspect and gained cultural-semiotic concepts and this has led to a kind of cultural as well as environmental sustainability. At the third level, we realize that the physical patterns of traditional and vernacular architecture with modern

technology largely conceal the physical influence of the past architectural work under its modern appearance. This is evident in some of the cases discussed in Table 2, including the Sharifi-ha House and the Iranian embassy in Seoul. In contrast, this new technology is hidden in the façade in some cases, including house designed by Nader Khalili. So it can be said that, to respond to the question “how can we use the features of vernacular architecture to develop a sustainable architecture aligned with the spirit of the contemporary period ?” to this purpose, we can contextualize vernacular architectural models and change their primary patterns to fit another locations and to serve different functions. Accordingly, it seems that the cases formed following this transformation of the original pattern are more successful than the others and those embedded in advanced technology are more in line with the spirit of the times. In this case, the Sharifi-ha House and the Iranian Embassy building and the Ambassador’s residence in Seoul are successful cases showing the integration of language of modern architecture with traditional and vernacular architecture. The reflection of technology and modern materials in the structure and the contextual understanding of the traditional architecture along with the transformation of the original pattern indicate the integration of the language of modern and traditional architecture and this is the answer to the second question. It can also be said that in response to the question “Is the modeling of vernacular architecture merely based on the form related to the linguistic approach or focuses on the content?”

In some works (e.g. Iranian Embassy building in Seoul, the Sharifi-ha House and to some extent in the Desert House), there is a contextual understanding, while the modeling of vernacular architecture in other cases is mainly based on form (semiotic expression). In responding to the third question, “How can we create a new language capable of regenerating the linguistic signs of traditional and vernacular architecture in the context of contemporary architecture and to gain a proper understanding of today’s audience and reach optimal efficiency?”

It can be said that vernacular and traditional architecture at any time and place has a series of formal features and brings together a set of physical components that have functional, structural and climate-responsive logic. These components, including desert wind catchers with climatic function, structural-climatic domes, climatic Ivans and sash windows with functional and formative-aesthetic features can be used as architectural terms are considered vernacular to the warm and arid region of Iran. The vocabularies are based on structural-climatic necessity that have been recreated in the context of contemporary architecture (e.g. the dome in Khalili’s works, or based on environmental sustainability logic, such as the Ivan in the desert house, or more as a symbolic form, such as a wind catchers at the Tehran Museum of Contemporary Art and the Dezfoul cultural-cinematic center). From this point of view, due to his pre-existing familiarity with these signs, the reader can develop a kind of understanding based on his memories, although in some of the works reviewed these perceptions from the historical context have been symbolic than functional and indeed it focuses on the function of linguistics.

Therefore, it is possible to achieve sustainable contemporary architecture based on the reading of the text of vernacular architecture and utilizing its contextual knowledge and combining it with new scientific achievements. This can be achieved by extracting its linguistic signs and presenting a new conception of the spirit of the time and enjoying modernity. Thus, based on analytical studies, the hypothesis of this study is proved. Therefore, the main solution to address the contemporary crisis in different fields (environmental, cultural, identity, etc.) is to re-integrate buildings with culture, tradition, environment and nature through modeling native architecture at different levels and layers-physical structure of aligned with the climate in combination with a semiotic perspective on the contextual level, etc.), besides benefiting from the positive achievements of modernist architecture reflecting the spirit of the times.

Endnotes

1. The modern architecture's language is based on modernity, which defines itself with a so-called "today". The word "today" denotes the lifestyle of nowadays, rather than the old one.

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