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Explanation of the parameters of socio-cultural sustainability in selected residential works of Iranian female architects

Honey Fadaie¹

1 Assistant Professor, Department of Architecture, Roudehen Branch, Islamic Azad University, Roudehen, Iran

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ABSTRACT

In recent decades, women in Iran have had significant activities in the field of architecture. A review of the famous female architect's design in Iran and the world shows their attention to the socio-cultural values of the society. Considering the importance of social-cultural sustainability goals in architectural design in order to promote social development and cultural identity of the society, this research aims to achieve these goals in female Iranian architects designs due to their special attention to social-cultural values. Furthermore, studying and analyzing the selected works of these architects with a sustainable approach can be an effective step in recognizing and solving socio-cultural problems. The present article aims to study the residential works of Iranian female architects who won the "Memar Award", the most prestigious Iranian architectural award, between 2010 and 2020 from the perspective of socio-cultural sustainability. The research method of this paper is descriptive-analytical based on library resources. In this research, while knowing the parameters of socio-cultural sustainability, their characteristics are compared with selected houses. The results show that the selected houses are all designed based on the criteria and parameters of socio-cultural sustainability with an emphasis on social justice, social security, localism and coordination to their context. By the analysis the mentioned socio-cultural features in selected cases, the architects can find the strategies in designing to achieve the sustainable development goals.

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*Corresponding Author:

Email: dr.fadaie@iau.ac.ir

Phone: +989122148114

ORCID: <https://orcid.org/0000-0003-4523-6028>

INTRODUCTION

As one of the main parts of social identity and a social structure, gender identity is strongly related to space. Because gender is a part of social system and social system is an important part of architectural space (Khorrani Rouz et al, 2020:226) Although gender differences are based on sexual differences (generally resulting from natural differences), they are created through social, cultural and historical ways that undergo changes over time and space (Farzaneh, 2011:99). The gender structure changes along with the transformations of the social organization. In the context of these changes, the space is transformed. The spatial identity of the city and its architecture, shape and physical aspects in Iran continuously accept new patterns until the current period (Sadoughianzadeh, 2020:91). A brief look at the position of women in Iran shows that the life and position of women in society has had many ups and downs throughout history (Haghayegh & Kharazmi, 2011:12). The history of the architecture profession by women goes back thousands of years. For example, Darius the Achaemenid used women as one of the most important workers to build Persian palaces (referring to inscriptions: a woman is responsible for 100 workers here) (ibid: 19). However, in the architecture and urban planning of settlements of global societies in general and developing comprehensive cities in particular, the majority of architects and urban planners are men and in the physical infrastructures of such cities, less attention has been paid to the effective role of women in the identity of cities. (Azani and Kheirandish, 2009). In Iran, with the arrival of western culture at the end of the Qajar era and the rethinking of traditional norms, many male arenas were changed to common collective spaces (Varmaghani et al., 2016:38).

The profession of architecture in Iran is also one of the areas where the presence of women has grown significantly in the last few years, and the percentage of female graduates in the field of architecture has been increasing compared to men. In fact, the entry of Iranian women into the

field of architecture dates back to the construction of the School of Fine Arts in 1940 and the beginning of the activity of this school for the education and training of students in the field of architecture. Since then, it became possible for women to attend fields that were completely exclusive to men (Azani and Kheirandish, 2009). Studying the contemporary buildings in Iran, especially in the last decade, has shown an increase in the successful participation of women in the field of architecture, especially in architectural competitions. Although gender differences are based on physical differences, how each gender behaves is a result of society. Therefore, gender is considered as a social factor and influenced by culture over time (Khorrani Rouz et al., 2020:222). This undoubtedly affects the architecture design. Considering the importance of social factors, investigating the impact of gender in the creation of architecture is not beneficial without the role of social and cultural parameters. Some scholars such as Rapaport consider gender behaviours as part of cultural-social factors that play a role in how the house is formed, or Erikson, who considers the social use of residence as a tool that makes it possible for people to do activities together, or It can be an obstacle for collective activities (Varmaghani & Soltanzade, 2018:125). Therefore, identifying socio-cultural parameters, especially in the field of sustainable development, in the study of contemporary buildings, including the works of women architects, seems necessary.

The term of social sustainability was considered as one of the three dimensions of sustainable development in the first years of the 21st century with the aim of improving the living conditions of the society. Social and cultural sustainability refers to the maintenance of social relationships and concepts, which is a factor for consolidating cultural systems. It also includes preserving and development the values and social relations among the citizens at the city level (Nasr and Emadi, 2021). It can be acknowledged that sustainable development is a multidimensional development that will happen in different

fields. The degree of success in achieving sustainable urban development is directly related to the degree of participation of citizens and the efficiency of urban management. Sustainable architecture and sustainable city can be seen as platforms for achieving sustainability goals, which bring social welfare, human rights, citizen social justice and urban human development, along with citizen social satisfaction (ibid). Since the development requires attention to human resources, it depends on the ability and participation of the members of each society. There is no doubt that presenting the ideal models of any development without considering the effect of women as half of the society cannot be a symbol of the complete model of development. Therefore, a society in the path of growth and development will be successful if it uses all its potentials in the direction of development and productivity. Thus, the role of women in achieving the aims of sustainable development is inevitable. A review at the position of Iranian women in the past shows that women's lives and their position in the Iranian society have been accompanied by many challenges throughout history (Haghighy and Kharazmi, 2011:12).

According to the importance of sustainable development and the significant role of Iranian women in today architecture, it seems inevitable to investigate and analyze the characteristics of their works in sustainable socio-cultural development. Compliance with these parameters in the design does not necessarily mean that they are male or female. Perhaps the male atmosphere of the society and the same cultural background that leads to the construction of gender have influenced the design of Iranian women as architects (Yaran and Arjomandi, 2021:92). For this reason, the main purpose of this paper is to identify the principles and parameters of socio-cultural sustainability in selected works of Iranian female architects. Due to the importance of residential building in sustainable urban development and the well-being of citizens, this paper scrutinizes on the study of the architecture of residential buildings designed by Iranian women.

MATERIALS AND METHODS

Methodology

The present paper aims to respond these two questions:

1. What are the socio-cultural parameters used in Iranian females' architecture?
2. How can socio-cultural sustainability parameters be used in the design of residential houses?

The research method employed in this study is descriptive-analytical based on library research. The main purpose of this research is to identify and analyze the parameters of socio-cultural sustainability in the architecture of contemporary Iranian women architects. Two different tools were used for the purposes of the study. The first tool was the texts about the ten selected projects of Iranian female architects regarding their designs. These texts were conceptually analyzed. The second tool was the visual analyzing of these projects. In the present paper, after studying the criteria and parameters of socio-cultural sustainability in architecture, the common principles and features of female architect's design described. Then, residential buildings that designed by Iranian women architects between 2010-2020, who have won the "Memar Award" a prestigious national Iranian award, are selected as case studies. Finally, the mentioned criteria and parameters are compared with the architectural features of the selected cases. Figure 1 shows the process of this research (Figure1).

The selection of case studies:

In order to be precise study, in this part, the samples of ten residential buildings are selected for further analysis. The most important criteria in choosing these samples are as follows:

1. Considering the growth of the population and the importance of dwelling in Iran, the residential building as one of the main living spaces of citizens in achieving the aims of sustainable development, in the present paper, the studies are limited to residential apartments.

2. In this paper, the author attempts to study the appreciated residential buildings, which were designed by Iranian female architects in Iran. Due to the small participation of Iranian architects in international architecture competitions, the buildings that have won the Memar award (one of the most prestigious national award for Iranian architecture) were selected. In addition, all works evaluated in this competition must be designed and implemented.

3. Considering the social and economic conditions in Iran and for the purpose of a more detailed study, this research has focused on the study of residential buildings built between the years 2010-2020.

The table 1 shows the characteristics of selected residential buildings that have designed by Iranian women architects and they have been ranked in “Memar reward”.

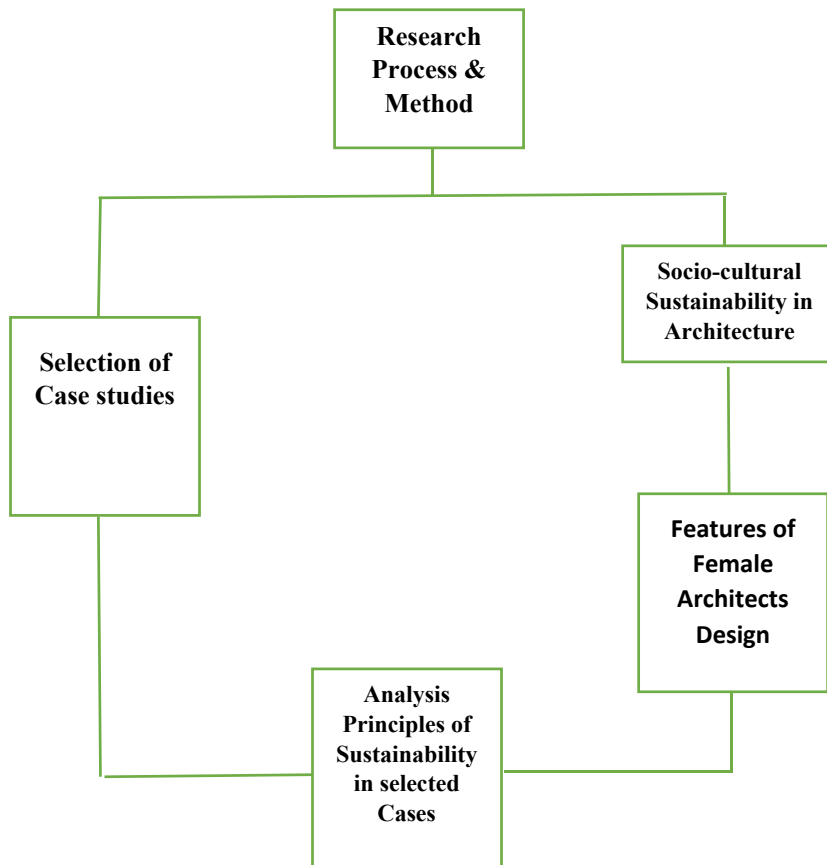


Figure1: The research Process

Table1: The Characteristics of selected Houses that won the “Memar Reward” in 2010-2020 (caoi.ir)

	Building's name	Architect's name	City	Built Date	Rank	Design's main Idea	Picture
1	Bidabad House	Elham Geramizadeh	Isfahan	2010	2	Creating a barrier with the exterior by the staircase and maintaining privacy(caoi.ir)	
2	Abadan Residential Apartment	Raha Ashrafi Amineh	Abadan	2011	1	Using climatic strategies in design in order to inhabitants physical comfort(caoi.ir)	
3	House No7	Atefeh Karbasi	Najaf abad	2012	1	Protection of nearby gardens and harmony of the building form with the surrounding nature(caoi.ir)	
4	Nadjevan Garden Residential Complex	Elham Geramizadeh	Isfahan	2013	2	Returning to nature & creating harmony between nature & architecture(caoi.ir)	
5	40Knots House	Habibeh Majdabadi	Tehran	2014	3	Using local materials and traditional Iranian construction methods in creating the building(habibehmajdabadi.com)	

	Building's name	Architect's name	City	Built Date	Rank	Design's main Idea	Picture
6	Villa Residence	Pantea Eslami	Tehran	2015	1	Visual communication with nature(caoi.ir)	
7	Rozan Residence	Farinaz Razavi Nikou	Tehran	2016	1	Introversion, coordination with site& maintaining privacy while having a favorable view (archdaily.com)	
8	Square House	Ameneh Bakhtiar	Isfahan	2017	1	The design concept based on Iranian modular geometry . Using the patterns of Iranian traditional architecture in the design (central courtyard, sunken courtyard, etc.) (caoi.ir)	
9	Nazar Mansion	Mahshid Karimi	Isfahan	2019	3	Using the patterns of Iranian traditional architecture(courtyard, sunken yard,etc) (caoi.ir)	
10	Approximation House	Habibeh Majdabadi	Tehran	2020	1	Returning to nature, using plants on the facade and roof of the building(archello.com)	

DISCUSSIONS AND FINDINGS

Features and Principles of Socio-cultural Sustainability in architecture

Originally, sustainable communities were related to environmental issues, but their notion grew over time to include other dimensions of sustainable development. In current literature, sustainable communities are related to a variable range of issues, such as socio-environmental relations (Kosanović et al., 2018:95). Social sustainability, which is measured and evaluated with its main form, which is the quality of life, is the provision of better living conditions in which balance, harmony, desirability and fair equality or the conditions required for a healthy life, security, comfort, Peace, vitality, creativity and beauty emerge (Salehi Marzijarani et al., 2023:125). Among the scholars, Squires conceptualizes social environment as a sub-category of the environment which “considers the culture that an individual lives in and the people and institutions with whom they interact. The social and personal identity of an individual is related to the identity of other members in a community, and the entire group reflects the patterns of these relationships, which ultimately becomes its characteristic (Moghaddam Ziabari et al., 2023:98). From O'Donnell's points of view, culture forming an umbrella over the economy, environment, and society components of sustainability demonstrating the integration of culture with sustainable global urbanism (Irani Behbahani et al., 2020:4).

In describing the characteristics of social sustainability, some experts have presented various views. According to Nasr and Emadi, Social sustainability means improving the quality of life, development of human resources and ultimately the self-sufficiency of local communities to overcome internal challenges and issues and react to external changes and manage to preserve values. The characteristics of social sustainability include social interaction and sociability, flexibility, readability, participation and choice, attention to the quality of space, creating a sense

of place and a sense of belonging-social capital, social security, environmental desirability and harmony with the surrounding environment (Nasr and Emadi, 2021). According to scholars in the definition of social sustainability, John Lang refers to the desire of people to live in a certain place and emphasizes the ability to continue such a process both now and in the future. Social sustainability combines social political principles with issues related to participation, happiness, well-being and quality of life, so the concept of sustainability requires a physical-social network. Rappaport emphasizes social interactions, spatial dynamics, vitality and human scale. Gehl pays attention to social interactions, spatial dynamics, vitality and human scale, and Altman considers security, spatial dynamics, social interaction-solitude, personal space and territory to be the principles and characteristics of social sustainability (Ghafourain et al., 2017: 32-34). Among other aspects of social sustainability in urban life and residential complexes, factors such as security, social communication, voluntary activities and participation have been identified as factors that are effective on the social aspect of housing and improving the level of people's interactions (ibid, 40).

In 2001, a process with the aim to add culture as the fourth sustainability dimension started with the UNESCO Universal Declaration on cultural diversity, which is also argued for by scholars (Axelsson et al., 2013:217). In the same year, Hawkes introduced cultural sustainability as a fourth pillar of sustainability, emphasizing the role of culture in local planning (Soini and Birkeland, 2014:214) that is derived from social sustainability, which has its own features in addition to similarities to social sustainability. Culture and art have always had many interactions and the influence of the culture of a region on the art and architecture of that region can never be denied or ignored (Dadashi et al., 2022:331), and “Cultural sustainability is the concept for the recovery and protection of cultural identities” (Torabi Farsani et al., 2012).

In the past, Iranian architecture had always a clear and consistent trend, which often had a logical relationship with the previous and subsequent periods, but since the Qajar and Pahlavi eras, we see a break in Iranian architecture (Nek-kooimehr et al., 2023:30). Therefore, preserving the identity and continuity of past traditions and patterns is one of the distinctive features of cultural sustainability.

According to the mentioned description of socio-cultural sustainability, the criteria of socio-cultural sustainability and its strategies in design can be expressed as follows (table2):

A Review on Features and Principles of Female Architecture Design

Based on the science of sociology and the sociology of gender, the behavior of men and women does not arise based on their biological differences, but people also accept certain attitudes and behaviors by accepting the society. In different periods of Iran's history, the definitions and views of women and the gender identity of women and men have been different. The dominant social, economic, cultural and religious paradigms can be considered involved in

the evolution of these views (Varmaghani et al, 2016:30). In Iran, regardless of the occurrence of modernity or not, it can be acknowledged that social-cultural events from the middle of the Qajar era and strongly in the Pahlavi era have led to the redefinition of the role of Iranian women and family in the society (Dadashi et al, 2022:331.).

The studies conducted on the works of contemporary female architects in Iran and the world indicate that common components can be shown the femininity of these projects. These components include user-centeredness, attention to specific details, flexibility, human scale, organic design, fluidity, transparency, dynamism, and horizontalism (Yaran & Arjomandi, 2021).

For example, the data from the analysis of sixty different structures by the ten female architects were presented the same features among them (UyarSun & Yasar, 2022). The selected female architects prioritized the function. Functional concerns, including spatial organization, and physical and sensory comfort were among the factors emphasized by the female

Table2: Features and Principles of Socio-cultural Sustainability in Architecture

No	Parameters & Principles of Socio-cultural Sustainability	Architectural Strategies in Socio-cultural Sustainable Design
1	Social Justice	Providing well-being and physical comfort - creating spaces for all genders and age groups
2	Developing Social Relationship	Creating flexible spaces - Creating public spaces for social interactions
3	Democracy and Citizen Participation	Creating public spaces for the use of all citizens (green spaces, pedestrian walkways, etc.)
4	Creating a sense of Cheerfulness, Comfort and Peace	Creating human physical and mental comfort - proximity to nature - providing daylight - beautifying and creating visual proportions in the building
5	The Interaction between Architecture and Nature	Creating harmony between architecture and nature - using plants and green spaces in building design
6	Social Security	Protection of privacy - provision of lighting
7	Preservation of Identity and Cultural Heritage	Using the traditional and historical patterns of Iranian architecture in building design
8	Localism	Using local materials and local methods in the building construction
9	Coordination with the Site	Coordination of functional aspects with the building's form - coordination of the building with the site and its neighbors

architects (*ibid*, 31). Another remarkable consideration was their concerns about reflecting the socio-cultural values. In particular, reflecting socio-cultural values in designs, and accordingly, strengthening the relationship between the city and the citizens, and reinforcing the relations at the intersection of the city and society were the prioritized considerations in the design approaches of the female architects(*ibid*,32).

The research on the works of famous Iranian female architects also reveals common characteristics. For instance, the main concerns of the Hariri sisters are attention to the human scale, harmony with nature, transparency and flexibility. In addition, the most important belief of these two architects is to pay attention to the concepts of sustainability in architecture, or Farshid Mousavi, who considers the concept to be one of the most important elements of design. She knows and uses people-centeredness and contextualism in her projects (*Yaran & Arjomandi, 2021:86*).

From the studies of feminist and postmodernist scholars, it can be concluded that characteristics such as nature, fluidity, unwillingness to model and unwillingness to centralize can be counted as characteristics that are more specific and obvious in the architecture of women. In

addition, nature can be introduced as a feminine element and common chapter among the works of scholars and some female architects (*ibid: 84*).

In general, attributing the mentioned features to women's architecture does not mean that these features are not present in men's architecture, but their seen in women's architecture has been seen more. Additionally, non-observance of other characteristics does not necessarily mean that they are masculine. Perhaps the male atmosphere of the society and the same cultural background have influenced the design of Iranian women as architects(*ibid:92-93*).

A review of the studies indicated that female architects used more nature and socio-cultural values in their designs. Therefore, a detailed study of their design is very important from the point of view of socio-cultural sustainability. In order to further clarify, in Table 3 the compatibility of the main features of women's architecture with the parameters of socio-cultural sustainability is demonstrated.

According to Table 3, the conformity of each of the socio-cultural sustainability parameters (*Table 2*) with the common features mentioned in the architecture of famous female architects is examined.

Table3: Correspondence of socio-cultural sustainability Parameters with the Female Architects Design

No	Parameters & Principles of Socio-cultural Sustainability	The common features of Female Architects Design
1	Social Justice	Functionalism-Flexibility
2	Developing Social Relationship	User centeredness-Functionalism-Flexibility-Dynamism
3	Democracy and Citizen Participation	Human scale-Functionalism-Transparency
4	Creating a sense of Cheerfulness, Comfort and Peace	Physical and Sensory comfort-Human Scale-Harmony with nature
5	The Interaction between Architecture and Nature	Harmony with nature-Organic Architecture- Fluidity
6	Social Security	Sensory comfort-Attention to social values
7	Preservation of Identity and Cultural Heritage	Attention to Socio-cultural values
8	Localism	Organic architecture-Coordination with the site
9	Coordination with the Site	Coordination with Site-Horizontalism

These features are included, user centeredness, harmony with nature, organic architecture, functionalism, fluidity, flexibility, attention to socio-cultural values, human scale, coordination with site, attention to physical and sensory comfort, transparency, horizontals and dynamism.

Assessment of the strategies socio-cultural sustainability in selected houses design

By analyzing socio-cultural sustainable principles and parameters in design strategies, and explaining these principles in architecture design, the criteria based on socio-cultural sustainabili-

ty were investigated. Accordingly, Table 1 shows the main design characteristics of socio-cultural sustainability.

Tables 4 and 5 explain the compliance of the main ideas of selected houses with socio-cultural sustainability parameters. As tables 4, 5 indicate, the principles and criteria of cultural-social sustainability in architecture are numbered according to the numbers listed in Table 1. In addition, these two tables show the extent to which design strategies of selected houses comply with socio-cultural sustainable principles.

Table4: Assessment the Compliance of the principles of socio-cultural sustainability in selected cases studies (From Bidabad to 40Knots House)

Principles of Socio-cultural Sustainability	Criteria and Adaptability Socio-cultural Parameters in five selected Houses				
	Bidabad House	Abadan Residential Apartment	House NO7	Nadjvan Garden Residential Complex	40Knots House
1	The staircase as a neighborhood space and between private and public spaces	Providing well-being and physical comfort of the residents	Creating common yards and public spaces on all floors	The possibility of view to the garden - connection the building with the green space	Creating a beautiful building with low cost for the middle class of society
2	-	-	Separation of public and private spaces	-	-
3	The absence of common spaces except for the staircase	-	Fluidity and flexibility of public spaces	-	-
4	The presence of the staircase space as a thermal filter reduces energy consumption - the presence of green space in the unusable spaces above and below the stairs	The use of climate strategies (canopy creation by solar panels, radiation control, wall thickness) for the physical comfort of residents in the hot climate of Abadan	Beautifying the building by combining shapes - view to the adjacent garden	View to nearby gardens - the possibility of benefiting from light and natural ventilation	Creating private spaces - solar radiation control & natural ventilation - beautification of the building by installing various openings
5	The presence of green space in the unusable spaces above and below the stairs	-	Preservation of the last garden of the neighborhood - making a gap in the building form in order to preserve the remaining trees	View to the nature and nearby gardens - creation of gardens for each flat on each floor	-

Principles of Socio-cultural Sustainability	Criteria and Adaptability Socio-cultural Parameters in five selected Houses				
	Bidabad House	Abadan Residential Apartment	House NO7	Nadjvan Garden Residential Complex	40Knots House
6	The presence of staircase between inside & outside in order to privacy	Maintaining privacy by separating the units	Separation of public and private spaces in the east and west of the building - controlling the view from the outside to the open space of the roof	Creating separate flower boxes in the balcony to maintain privacy - Creating gaps and folds in the facade surface in order to limit the view to the neighboring flats	Creating private terraces - using protective fences - supply and control of daylight by using suitable openings
7	Using corridors inspired by traditional Iranian architecture	-	Preservation of the surrounding gardens in order to protect the historical memory of the site - separation of public and private spaces similar to Iranian traditional architecture	Using traditional Iranian architectural patterns: maintaining privacy, using plants	Inspired by the Iranian carpet weaving in the facade - the brick texture of the facade is inspired by brickwork in traditional Iranian architecture
8	Using local materials e.g., stone	Using local materials and appropriate to the weather and dust conditions of Abadan	Using local materials e.g., brick	Using local materials e.g., brick	Using local materials e.g., brick- Ease of building construction using traditional methods
9	Coordination of the building with its neighboring buildings	Adaptation of the building with the height of the land and the climatic conditions of the region	Compliance of the building form with the trees on the site	Aligning the facade of the building with the facades of neighboring buildings	The form of the building is integrated and proportional to the urban scale

Table5: Assessment the Compliance of the principles of socio-cultural sustainability in selected cases studies (From Vila Residence to Approximation House)

Principles of Socio-cultural Sustainability	Criteria and Adaptability Socio-cultural Parameters in five selected Houses				
	Villa Residence	Rozan Residence	Square House	Nazar Mansion	Approximation House
1	Physical plan according to site restrictions - cost reduction by using materials obtained from building demolition	Separation of private and public spaces - using the green yard as a common space	Using courtyard & Sunken yard	Using the central courtyard and common spaces instead of the partition wall	Creating public spaces on the roof, family gardens
2	-	Connecting floors and public and private spaces with each other by the slope of the land	Using climatic strategies in design: courtyard...	Using the central courtyard and semi-open spaces according to the floors	Creating public spaces such as green roofs, swimming pools, etc.

Parameters of socio-cultural sustainability in selected residential works of Iranian female

Principles of Socio-cultural Sustainability	Criteria and Adaptability Socio-cultural Parameters in five selected Houses				
	Villa Residence	Rozan Residence	Square House	Nazar Mansion	Approximation House
3	-	Using public spaces like, courtyard	Flexibility by using the modular model - cohesion and unity in the whole building	Using open public spaces: courtyard	The continuity of the green space from the facade to the roof of the building
4	Designing the trees on the opposite wall of the building in order to create a good view	Using green space and water pond - beautification with variety in lighting	Using Climatic strategies in building design: central courtyard, light control with wooden grids, wind catcher and...	Diversity in the quality of flats - connection of all flats with open and semi-open spaces - possibility of view to the river	Returning to the nature by using open green spaces for human comfort
5	-	Installation of green space and water pond in the yard	The presence of green yard, a water pond and a sunken yard	Creating a green roof - overlooking the river	Returning to the nature by using open green spaces
6	Optimal use of daylight	Introversion - creating a continuous shell on the facade to limit the view from the outside to the inside of the building the possibility of view from the inside to the outside &	Placing wooden nets in the empty parts of the building in order to maintain privacy	Introversion and maintaining the privacy of the building	Creating private terraces with movable wooden panels while controlling radiation limits the view into the building
7	The use of traditional methods of brickwork in the construction of the facade	Introversion of the building inspired by traditional Iranian architecture	Inspiration from Iranian modular geometry in plan design - use of grids and wooden decorations similar to traditional Iranian architecture	Inspired by traditional architectural spaces: the central courtyard, sunken yard and...	Using natural materials & traditional construction methods
8	Building construction by using brick waste	-	Using local materials e.g., brick, wood- Using traditional patterns of wooden decorations on the facade	Using local materials e.g., brick	Using natural materials -using human power in building construction and not using advanced technology
9	The construction of the building conforms to all the site restrictions with the possibility of the best view	the building according to the slope of the site	The coherence and continuity of the building with the historical urban fabric	Construction of the building in full compliance with the slope of the land	-

RESULTS AND CONCLUSION

The main aim of this research was to identify the parameters of socio-cultural sustainability as one of the pillars of sustainable development in contemporary residential architecture of Iran. Considering the disappearance of gender boundaries in the architecture profession in Iran and the significant role of Iranian women architects in recent decades, an attempt was made to formulate sustainability criteria in their works. To this purpose, firstly, ten residential buildings designed in recent years by those who won the prestigious “Memar “award were selected and their features and main design ideas were described and explained. Then, based on library sources and studies, the principles and parameters of socio-cultural sustainability

and their strategies in design were extracted and introduced. The main parameters include, social justice, developing social relationship, democracy and citizens participation, creating sense of comfort and peace, interaction between architecture and nature, social security, preservation of identity and cultural heritage, localism and coordination with the site. In the third stage of this study, the compliance of the principles and criteria of socio-cultural sustainability with the characteristics of the selected houses was studied and investigated (tables 4 and 5). Recognition of these parameters and criteria is the answer to the first question of this research about the cultural and social parameters used in the works of Iranian female architects.

Table6: Summary and quantitative assessment of compliance with the principles of socio-cultural sustainability in selected case studies

Principles of Socio-Cultural Sustainability	The Adaptability of Selected Houses with Socio-cultural Sustainable Parameters									
	Bidabad House	Abadan Residential Apartment	House NO7	Nadjevan Garden Residential Complex	40Knots House	Villa Residence	Rozan Residence	Square House	Nazar Mansion	Approximation House
1	■	■	■	■	■	■	■	■	■	■
2	□	□	■	□	□	□	■	■	■	■
3	□	□	■	□	□	□	■	■	■	■
4	■	■	■	■	■	■	■	■	■	■
5	■	□	■	■	■	□	■	■	■	■
6	■	■	■	■	■	■	■	■	■	■
7	■	□	■	■	■	■	■	■	■	■
8	■	■	■	■	■	■	□	■	■	■
9	■	■	■	■	■	■	■	■	■	□

Quantitative assessment of compliance with socio-cultural sustainability parameters in selected case studies

In the next step, the compliance of these parameters with the studied houses is shown in Table 6. The compliance with the mentioned standards is shown using black and white squares. White indicates non-compliance squares and compliance is determined by black squares (table6). In this regard, according to Table 6, the ratio of black squares to all socio-cultural sustainability parameters is determined as the percentage of compliance with the mentioned principles and parameters.

Analyzing data show that in some selected houses such as, Bidabad and Square houses, the compliance percentage to sustainable parameters are 100%, while this value reaches to the lowest in some houses like villa residence (about 66%). In addition, as Table 6 indicates, all the case studies are in compliance with most of the principles and criteria of socio-cultural sustainability. In this regard, criteria such as social justice, sense of comfort and social security have been considered in the design of all these buildings. While less attention has been paid to some criteria such as social interactions and participation of citizens (Table 6). For this reason, it is inevitable to pay attention to these principles and criteria in design.

The results from Tables 4, 5, and 6 are proof of the conformity of the works of Iranian female architects with the criteria of socio-cultural sustainability, and the obtained information from them can be the answer to the second question of this paper.

In conclusion, this model of residential design based on characteristics of socio-cultural parameters of sustainability can be generalized in other buildings design in order to achieve the objectives of sustainable development.

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