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Analysis of Physical Components of the Entrances of Localities Passages in Yazd with a Climate Sustainability Approach

Reihaneh Mesgaran Kermani [1], Seyed Majid Mofidi Shemirani *[2,3], Niloofar Nikghadam [2,4]

1. PhD Student, Department of Architecture, Mashhad Branch, Islamic Azad University, Mashhad, Iran
2. Department of Architecture, Mashhad Branch, Islamic Azad University, Mashhad, Iran
3. Assistant Professor, Department of Architecture, Faculty of Architecture and Urban Planning, Iran University of Science and Technology, Tehran, Iran
4. Assistant Professor, Department of Architecture, Faculty of Architecture and Urban Planning, South Tehran Branch, Islamic Azad University, Tehran, Iran

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ABSTRACT

Lack of paying attention of contemporary architecture and urban planning to the environment and adaptation to the climate of the region, Climate sustainability has become a significant issue in urban revisions. To increase climatic stability in a city, effective physical components must be considered in the localities of that city. Awareness of these components and their priorities in architectural design and urban design is the basis of climate sustainability. The purpose of this study is to obtain and analyze the physical components of the entrances to the localities of Yazd. Since more than 3/4 of Iran is covered by arid climate, it was examined in this study. The old texture of Yazd is one of the best architectural models compatible with arid climate of Iran, which its teachings can give suitable guidelines for contemporary architecture and urban planning. In this regard, three localities from the historical texture of Yazd were selected as research samples. This research is of applied in terms of aim and its methodology is descriptive-analytical conducted by library method and field survey. The method of research and data analysis method is mixed (qualitative and quantitative). First, physical components entrance of localities passages were taken and examined and by comparing and analysis the results, effective components in climate sustainability were obtained. Results suggest the effect of physical components of locality entrances on climatic stability in arid climate of Iran.

***Keywords**: Climate Sustainability, Entrances of Localities Passages, Physical Components, Yazd*

1. INTRODUCTION

Climatic architecture with the least destructive effects on its environment and paying attention to existing natural resources and saving on the use of non-renewable resources and preserving it for the future and its impact on the surrounding environment is a key step towards sustainable development.

The issue of climatic architecture in Iran has a long history. Historical architecture of Iran can be considered as a clear example of climatic architecture. However, in contemporary Iranian architecture, with superficial and slogan-like approaches that result from misunderstanding and fundamental principles and concepts of climate architecture in this area, its position has reduced to ephemeral styles and in they are in contrast to the environment and climate.

*Corresponding author:
S_m_mofidi@iust.ac.ir

Thus, planning and design based on climate and following the appropriate patterns of climatic conditions of each region are the requirements for achieving sustainable architecture and subsequently sustainable development. The present study was an attempt to obtain some of these relations and patterns in one of the dominant climates of Iran. Since more than 2/3 of Iran is covered by arid climate, this climate was examined to evaluate and achieve the mentioned patterns in the physical components of the entrances of localities passages.

To prevent the increasing spread of building facade patterns and volumes that are formed without semantic, formal and ecological support and form a heterogeneous combination of street and urban walls, it is necessary to build the walls and facades of buildings and the city as a member from the visual perspective of the city. Paying attention to the mentioned issue requires recognizing the elements that make up the facade. The elements and components that by ignoring them, the visual and aesthetic quality of the walls and views of buildings and the city guide have been destroyed and reduced to a superficial level resulting from functional interior design [5]. Based on one of the theories, some of the reasons for climate change in statistical periods are associated with excessive human activities, particularly industrial activities and greenhouse gases. During the 20th century, amounts of greenhouse gases such as CO2, CH4 and NO2, have considerably increased in the atmosphere. As much as 5 to 6.2 billion tons of dioxide enters the atmosphere annually. According to the forecasts by the Intergovernmental Panel on Climate Change (IPCC), about the population growth and the increase in the human need for energy, the amount of Carbon Dioxide will increase from 3.1 billion tons in 1985 to 4.7 billion tons in 2025 [6]. Successive droughts, severe and sudden floods, cold and hot airwaves are one of the consequences of climate change, which have caused the earth to face various crises. So, recognizing the present and future climate situation is significant for urban planners and designers [9]. In previous studies, traditional Iranian architecture and urban planning has been recognized as one of the most complete forms of contextualism in the world. A city requires favorable natural conditions, cultural and social relations and economic life to survive. Regarding the natural factors, traditional Iranian cities have adapted to the environment as if they were the environment itself. In fact, Iran is one of the few countries in the world that historically could create a diverse architecture in light of its cultural and geographical characteristics. This diversity can be observed even in the geographical divisions of a limited area. In general, various factors such as topography, climatic characteristics, economic capabilities, and livelihood and water resources in Iran have contributed to the emergence of different physical textures. This special geographical and climatic situation along with the intelligence of the past of this land in using natural energies such as wind and sun, both in arid regions and in humid area of this country, caused the emergence of this unique architecture [15]. Traditional Iranian architecture has a strong background of various aspects of sustainability, Iranian art and culture and reflects a special value of this art and culture [11]. Research suggests that the techniques and rules used in Iranian indigenous architecture have all the characteristics of sustainability and clearly have many new concepts in the field of sustainable architecture and can respond to environmental issues appropriately. One of the effective steps taken in the area of optimizing energy consumption in residential buildings is the use of natural energy and climatic design of buildings based on the principles of sustainable architecture in each region. Climatic design has been the main theme of architecture in the past [12]. In Iran, the useful life of a building is 20 to 25 years. Today's cities are like construction workshops, where a large number of buildings are being built or demolished every day in every alley. A large part of the national capital, energy and environmental resources is wasted every year, resulting in damage to the country and even the world. Moreover, lack of models to achieve adaptation to the climate has left the designer, builder, operator and all construction stakeholders with a kind of ambiguity and confusion. The only official action in Iran in this regard is Article 19 of the National Regulations, which summarizes energy savings only in the form of thermal and acoustic insulation of buildings and presents the same pattern for the whole of Iran, despite its climatic and geographical diversity. Other steps taken in this regard are objective translations of the experiences of countries that sometimes have no similarity to Iran [8]. Based on the studies conducted so far, some of which were presented

in this section, the need to develop completely indigenous models and compatible with Iran's climate is quite clear. Since Iran's past architecture is the best model compatible with climate conditions, its experiences should be used to achieve models that respond to the climatic characteristics of a given region and then use them as a reference for use in areas with similar climates in Iran. An indigenous view of such research and conducting it based on the climatic characteristics of the Iranian region is the best solution to achieve these principles and models, since the existing and successful models of the world today cannot be effective for other countries, especially developing countries such as Iran. Even if its technical infrastructure is provided to use renewable energy, very important and fundamental issues such as economic issues, maintenance methods, operation, etc., will remain unresolved. Given the spatial value of the historical city of Yazd and its location on the central plateau of Iran with arid climate, and according to previous studies, this city is one of the best examples of climatic architecture that has been registered by UNESCO, so city was selected as a sample of study. The present study was an attempt to examine physical components of the entrances of localities passages in Yazd. Its results help us to achieve relations and proportions in design of exterior coverage to achieve climatic management in this region. In fact, the aim of this study is to achieve physical components affecting climatic sustainability in the localities skins of arid climate in Iran. To achieve these objectives, the research survey was conducted in Yazd, Iran in 2019 to 2021.

2. Materials and Methods

2.1 Methods

The methodology of this research is descriptive-analytical based on qualitative analysis and the research strategy is a combination of descriptive method and case study. Qualitative content analysis seeks a development model instead of a core theory. Thus, by using the method of qualitative content analysis based on the logic of deductive reasoning and by using the shared expressions in common theories in architectural approaches and with the aim of achieving maximum comprehensiveness in approaches, the present study developed criteria, proportions and relations based on indigenous architectural mapping. The aim of deductive research is to help explain the research findings in the form of relations, formulas and proportions governing exterior coverage similar to climate of the studied area.

2.2 Research variables and indicators

Library studies and field methods were used to collect data. The method of research and data analysis is mixed (a combination of qualitative and quantitative methods) and a comparative causal method was used in this regard. Several cities in arid climate of Iran were considered for study in the present study. According to views of experts and UNESCO, which considered Yazd as the best climatic and historical model, the localities of this city were studied as a case study. The three localities of Shah Abolghasem, Sahl Ibn Ali and Vaqat al-Saat, which are old and inner localities of the historical texture of Yazd city and have valuable buildings, and are historically and strategically important in the passageways, squares and entrances, physical components such as dimensions, materials, color, dominant form, type of coating were selected for the study. By comparing and analyzing the results, effective components in climate sustainability were obtained. Data collection tools in this study included note-taking sheets, tables, detailed maps of localities that were prepared from the cultural heritage of Yazd and passageways and numbered plaques, sketches of facades taken with measuring devices and after adapting to the photos taken by the camera, they were accurately drawn in the tables. Then, the plaques were drawn in each passageway and the bodies were displayed accurately, and then by examining, comparing and analyzing the bodies in the passageways, squares and entrances, the effective components in climate sustainability in the localities of this city and climate were obtained. The characteristics and results of the analyses can be generalized to the same climate. In other words, the case study has an external validity.

2.3 Geographical scope of research

The study area in the present study is the city of Yazd in Yazd province. This city is located in the east of Isfahan and in the south of Lut desert in the center of Iran. Three sides of east, south and north have surrounded its mountains and its west side is open. Being located in the central part of the Iranian plateau has provided the most unfavorable natural factors governing the central plateau of Iran. Low rainfall with severe evaporation, distance from the sea, proximity to the vast dry and salt desert, low relative

humidity with high heat, extreme temperature fluctuations are some of the factors that make Yazd one of the driest regions of Iran. Fig. 1 shows the location of the city of Yazd in the center of Iran.

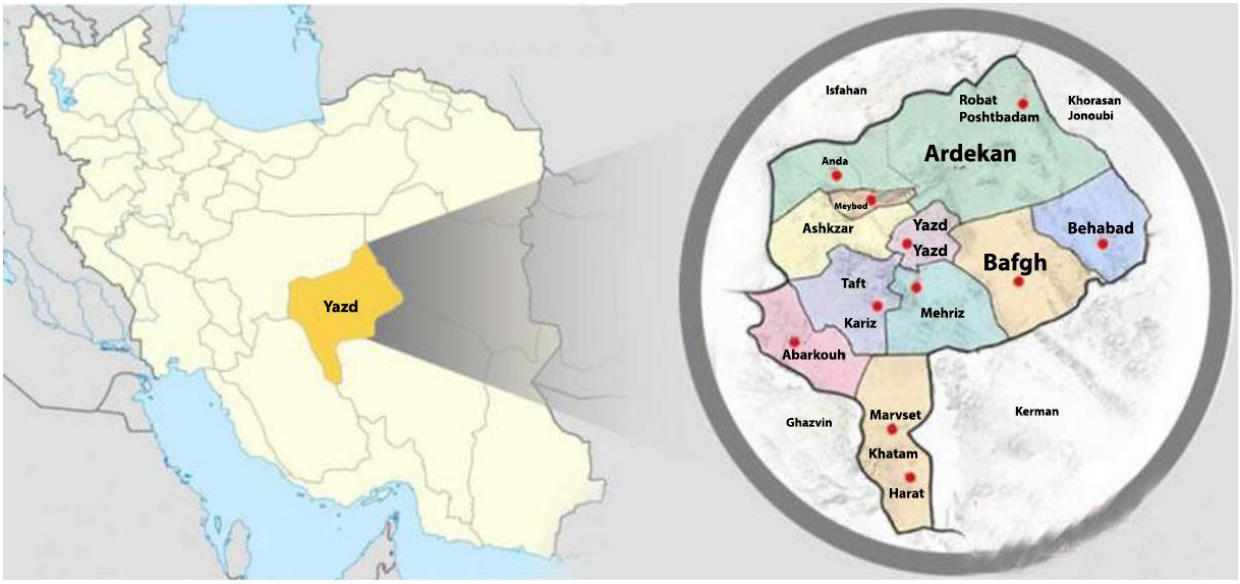


Fig. 1: Location of the study area
(Archive of Yazd Cultural Heritage Organization, 2019)

With its history and indigenous architecture, it has undergone several changes in different periods and accordingly is divided into three parts: 1- The historical part of the city, including the old and inner part, related to before the ninth century AH that has a physically intensive composition. 2- The historical part of the city, including the middle part, which shows the city complex until the establishment of the Pahlavi government in 1920, which is relatively open in terms of physical composition. 3- The new and outer parts of the historical walls of city that their expansion was accelerated in 1958-1968 and during the Islamic Revolution and it has a diverse physical composition. In the present study, the old and inner historical part of the city was selected due to its spatial values and indigenous architecture. The historical texture of Yazd with 43 localities has been registered by UNESCO. Its three localities were selected and studied due to their different valuable characteristics and their impact on the formation of the old texture of Yazd and having passageways, squares and buildings with historical value. Fig. 2 shows three different districts of the Yazd city and the location of the localities studied in this study.

3. Results and Discussion

Results show physical components in line with climate governing this region in entrances of Yazd localities, as one of the best examples of arid climate architecture in Iran. All images taken and sketches of the exterior coverage in this section have been done by the author.

3.1 Entrance Samples of Shah Abolghasem locality

In this locality, entrances of the main square and entrances of the two main passageways leading to the square were selected. Hosseinieh Shah Abolghasem surrounded the square, and passageway 001, including 16 plaques, 12 residential land uses, one water storage and 3 ruined place, and passageway 002, including 19 plaques, 16 residential land uses, 2 commercial land uses, a tomb. Location of the square, passages, and main photo entrances of Shah Abolghasem locality of Yazd was shown in Fig. 3. The condition of the entrance skins of the locality was collected and summarized according to the Table 1. And then the physical characteristics of the entrance in this locality were categorized in Table 2. After examining and evaluating all results in three localities, the physical components of the entrances of Yazd localities were presented in Table 9.

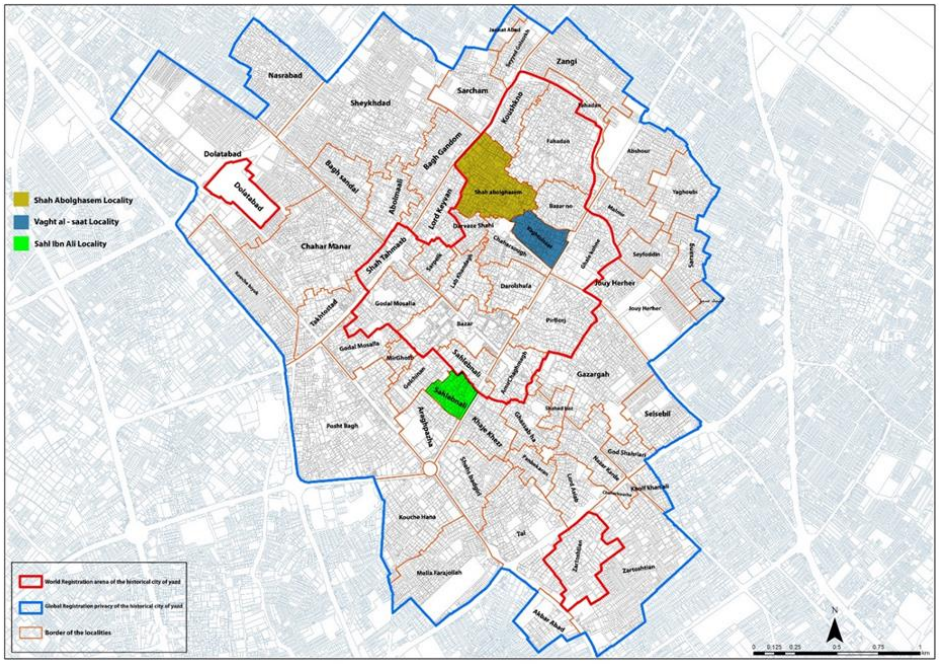
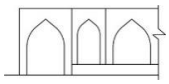
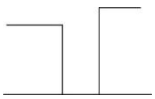
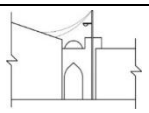


Fig. 2: Area and privacy of the historical texture of Yazd and the location of the three surveyed studied districts (Archive of Yazd Cultural Heritage Organization, 2019)

Table 1: Summary of the condition of the entrances of Shah Abolghasem locality

Average height (meter)	Average width of exterior coverage (meter)	Dominant form skins	Skin Materials	Skin color	Floor Materials	Floor color	Dominant features of skins
4/16 Min: 3/51 Max: 5	2/46 Min: 1/74 Max: 3/18	Arches with truncated arches With a height of 3.5 meters	Thatch & Brick	Cream	Brick & Stone	Cream & Gray	Consists of a combination of brickwork and thatch and truncated arches with an average height of 3.5 meters and the presence of sabat in the entrances with truncated arches

Table 2: Physical characteristics of the entrances of Shah Abolghasem locality

Physical component Entrance	Factors influencing the definition of space personality						Space constraint	Type of cover
	Form	Entrance Position	Color & RGB	Materials	Entrance Dimensions			
					Width	Height		
0011		Sabat with a truncated arch along the wall, No. 19016, and the body of C Square	119-154-194 115-154-192 255-255-255	Dark Thatch Dark brick Plaster	3	4/21	Vertical	Monotonous and opaque
0022		Entrance arch with truncated arch along the passage wall 002 and body B of the square	150-216-251 119-154-194 255-255-255 115-154-192	Bright brick Dark Thatch Plaster Dark brick	18/3	93/3	Vertical	Monotonous and opaque
001		Simple skin	139-183-224 169-219-249 255-255-255	Dark Thatch Dark brick Plaster	2/5	5	Vertical	Monotonous and opaque
002		Stair body with different offerings and with sabbat with truncated arch	224-183-139 249-219-169 255-255-255	Dark Thatch Dark brick Plaster	3-4/6	5	Vertical	Monotonous and opaque

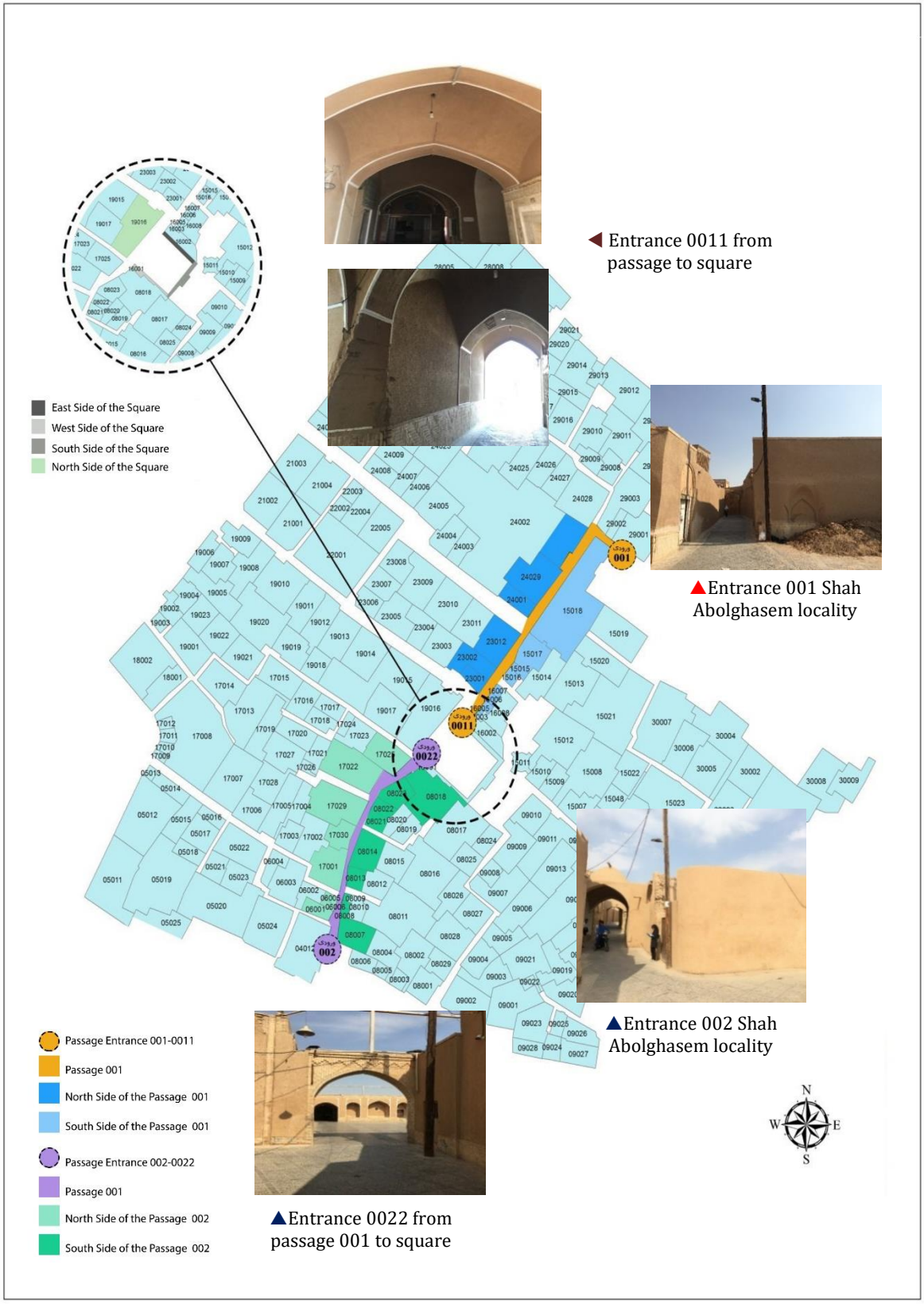


Fig. 3: Location of the square, passages, and main photo entrances of Shah Abolghasem locality of Yazd

3.2 Entrance Samples of Sahl Ibn Ali locality

In this locality, two passageways that connected this locality to the main street and parking lots were selected. Passageway 001 includes 20 plaques, 15 residential land uses, Sheikh Sadoughi House, Pirnia House, Yazd University of Arts, University Library, and Imamzadeh Sahl Ibn Ali building. Passageway 002 includes 20 plaques, 18 residential land uses; Sahl Ibn Ali Mosque and one ruined place. Location of the main passages, and photo entrances of Sahl Ibn Ali locality of Yazd was shown in Fig. 4. The condition of the entrance skins of the locality was collected and summarized according to the Table 3. After examining and evaluating all results, the physical components of the entrances of Yazd localities were presented in Table 9.

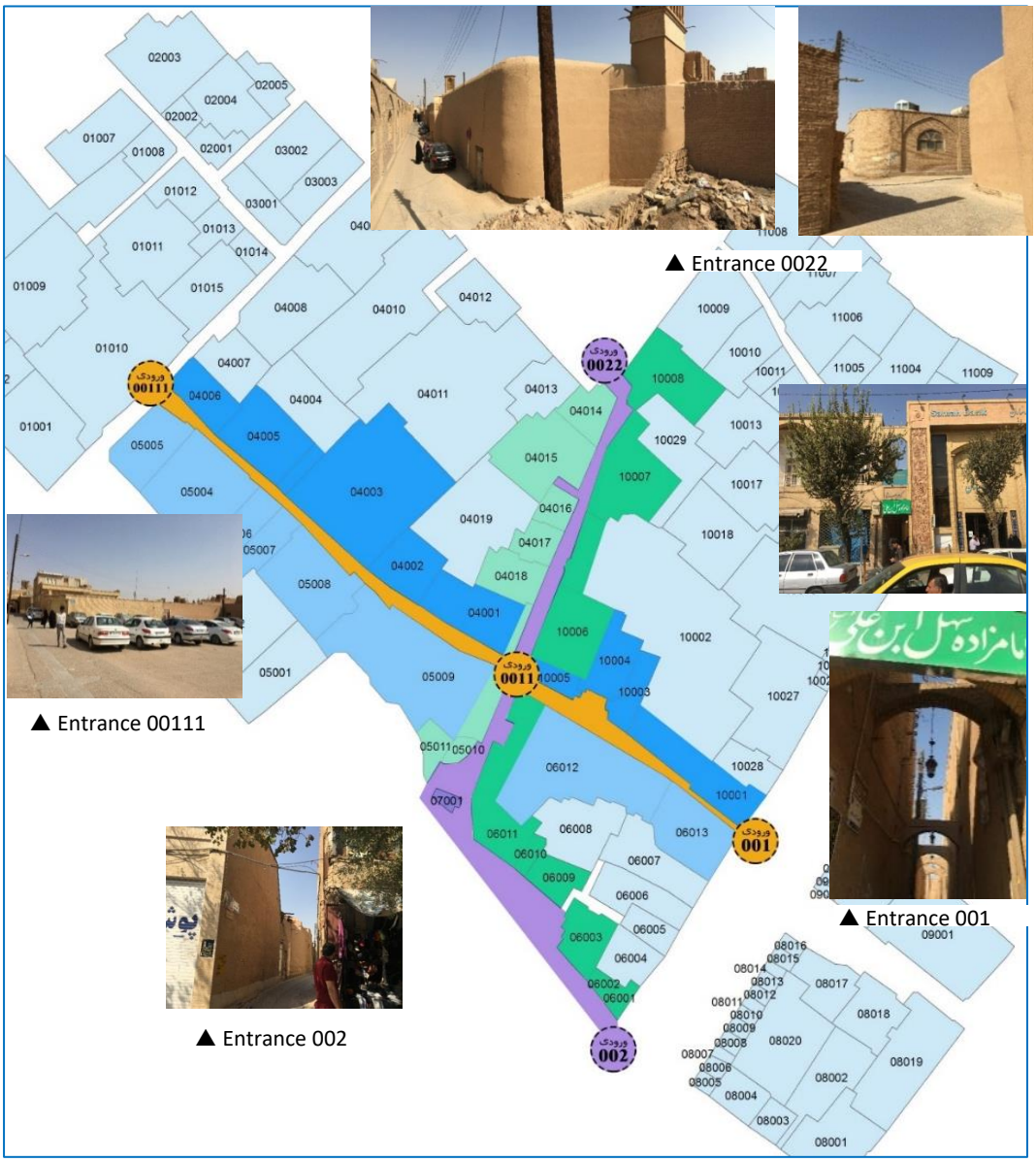


Fig. 4: Location of the main passages, and photo entrances of Sahl Ibn Ali locality of Yazd

Table 3: Summary of the condition of the entrances of Sahl Ibn Ali locality

Average height (meter)	Average width of exterior coverage (meter)	Dominant form skins	Skin Materials	Skin color	Floor Materials	Floor color	Dominant features of skins
5/40 Min: 3/20 Max: 7	3 Min: 1/7 Max: 4/7	Entrances with narrow width and crescent and truncated arches and on both sides with general uses of market and parking	Thatch & Brick	Cream	Concrete, rubble, asphalt and brick	Cream & Gray	Consists of a combination of brickwork and thatch and truncated arches with an average height of 3.5

Table 4: Physical characteristics of the entrances of Sahl Ibn Ali locality

Physical component Entrance	Factors influencing the definition of space personality						Space constraint	Type of cover
	Form	Entrance Position	RGB Color &	Materials	Entrance Dimensions			
					Width	Height		
001		Sabat with a truncated arch along the wall, No. 19016, and the body of C Square	223-169-122 236-189-137 28-27-25	Bright Thatch Dark brick Metal	1/72	7	Vertical	Diverse And opaque
002		Between the two bodies of Imam Street Bazaar	251-216-150 223-169-122	Bright brick Bright Thatch	2/6	7	Vertical	Diverse and opaque
00111		From the parking lot	251-216-150	Bright brick	4/7	4-7	Vertical	Monotonous and opaque
0022		With a body with variable dimensions and various shapes	223-169-122 251-216-150	Bright Thatch Bright brick	4/2-5/14	4-7	Vertical	Monotonous and opaque

3.3 Entrance Samples of Vaqt al-Saat locality

In this locality, entrances of the main square and entrances of the four main passageways leading to the square were selectedThe square and 4 passageways leading to it were selected in this locality. Four bodies of the square includes 12 plaques, including 7buildings with residential land use, 3buildings with caravanserai land use, one restaurant and one tomb of Sayed Rakneddin. Passageway 001starts from the boulevard leading to the Grand Mosque Yazd includes 12plaques, 10residential land uses, one hotel and one tomb of Sayed Rakneddin. Passageway 002started from the bazaar includes 11 plaques that of them have residential land uses. Passageway 003started from the border of Shah Abolghasem and Vaqt al-Saat localities include 4plaques with residential land uses located under Sabat. Passageway 004includes 25plaques that had 18residential land uses, one hotel, two cafes, one restaurant and 3ruined places. Location of the square, passages, and main photo entrances of Vaqt al-Saat locality of Yazd was shown in Fig. 5. The condition of the entrance skins of the locality was collected and summarized according to the Table 5. After examining and evaluating their results, the physical components of the entrances of Yazd localities were presented in Table 9.

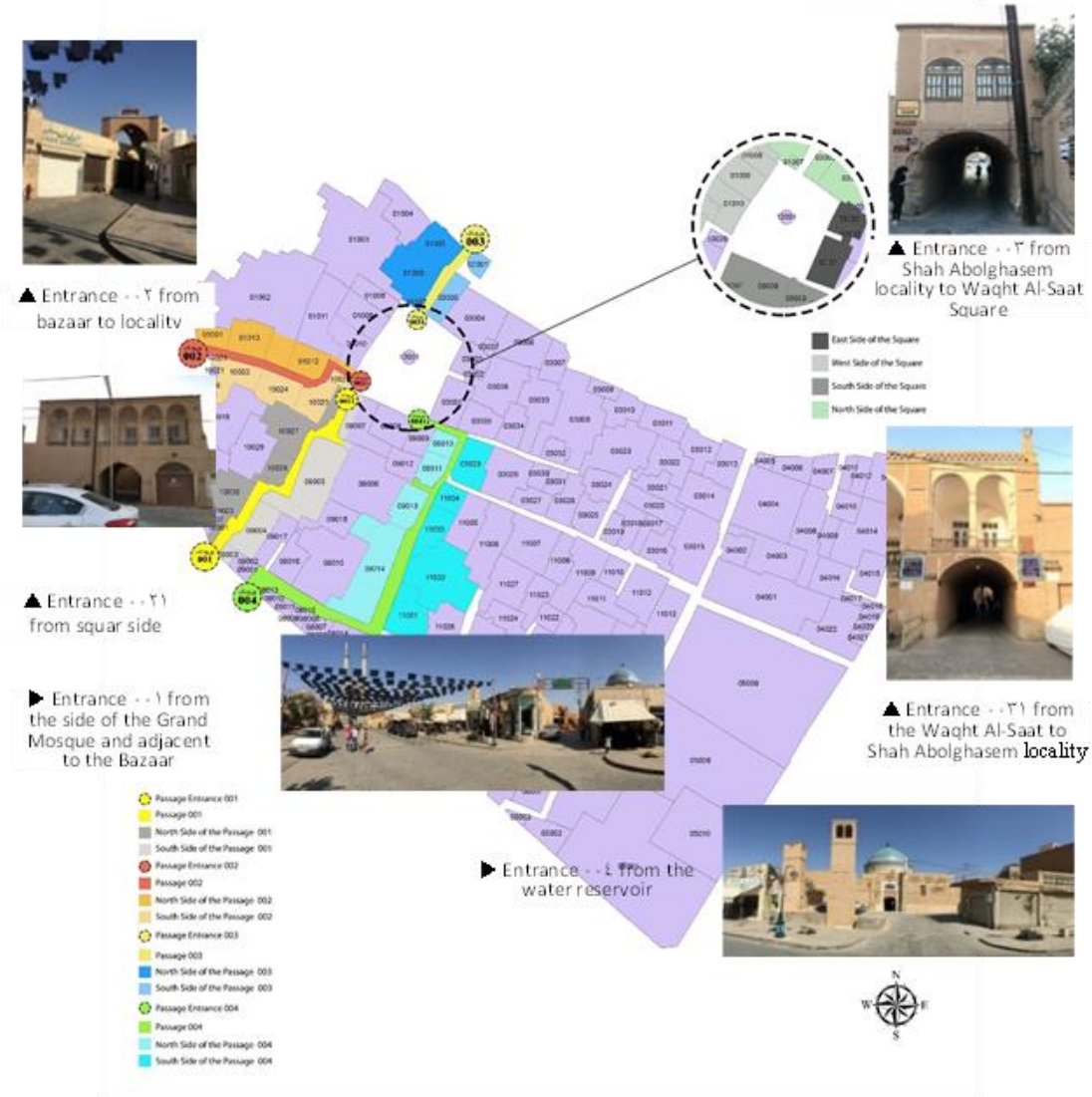
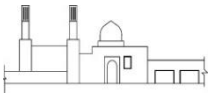
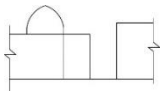
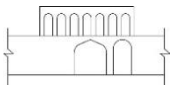
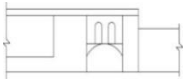
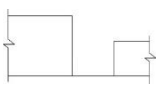


Fig. 5: Location of the square, passages, and main photo entrances of Vaqt al-Saat locality of Yazd

Table 5: Summary of the condition of the entrances of Vaqt al-Saat locality

Average height (meter)	Average width of exterior coverage (meter)	Dominant form skins	Skin Materials	Skin color	Floor Materials	Floor color	Dominant features of skins
5/65 Min: 3 Max: 7	3/60 Min: 2 Max: 6/51	The floor of the square was lower than the floor of the passages and were connected slopingly. Entrances to the square are often crescent-shaped	Thatch & Brick & Metal & glass & tile	Cream & Gray & Blue	Brick & Stone & Rubble & tiles	Gray	Skin from the side of the Grand Mosque with horizontal and vertical lines and with the headboard of the holy shrine sign of Seyyed Rokn al-Din Mohammad

Table 6: Physical characteristics of the entrances of Vaqt al-Saat locality

Physical component Entrance	Factors influencing the definition of space personality						Space constraint	Type of cover
	Form	Entrance Position	Color & RGB	Materials	Entrance Dimensions			
					Width	Height		
001		On the side of the Grand Mosque, between the commercial body and the floor above the street floor with the famous entrance of the shrine	-216-150 251 28-27-25	Dark Thatch Dark brick Glass	5	4	Vertical	Diverse and opaque
002		Adjacent to the bazzar entrance and level with the crescent arch	-183-139 224 -216-150 251	Bright brick Dark Thatch	3/30	4/20	Vertical	Monotonous and opaque
003		Sabat with a crescent arch and a room with 2 doors on it	-169-122 223 -189-137 236	Dark Thatch Dark brick	3/30	7	Vertical	Monotonous and opaque
004		From the commercial skins and the water reservoir and the square	223-169-122 251-216-150 187-215-216 28-27-25	Bright Thatch Bright brick Tile Metal	6/15	3-7	Vertical	Monotonous and opaque
0011		Along the wall and one of the skins of the square	199-152-106 192-154-115	Bright Thatch Dark brick	2/40	5	Vertical	Monotonous and opaque
0021		Sabat with truncated arch and above the entrance of the porch 6 arched crescent sloping floor above the square floor	199-152-106 192-154-115	Bright Thatch Dark brick	3/40	7	Vertical	Monotonous and opaque
0031		Sabat with crescent arch and porch with two crescent arches above the entrance and floor level with the floor of the square	199-152-106 192-154-115 114-116-182 255-255-255	Bright Thatch Dark brick Tile Plaster	3/30	7	Vertical	Monotonous and opaque
0041		Along the passage wall and one of the skins of the square	199-152-106 192-154-115	Bright Thatch Dark brick	2	5/5	Vertical	Monotonous and opaque

3.4. Examining the physical characteristics of the entrances of the main squares of the research areas

It seems that the type of space constraint is vertical and in the Vaqt al-Saat square of the two openings due to the occurrence of sabat and high use of the entrance, its skin has an average height of 7 meters with an average width of 3.35 and with a crescent arch height of 3.20 and there are two other entrances that are along the passage wall with an average skin height of 5.25 and an average width of 2.20 meters, but in Shah Abolghasem Square all three entrances with an average height of 3.88 and with an average width of 2.64 meters and a truncated arch height of 3.88. In both squares, there are two Sabat entrances, which have a crescent arch at the Vaqt al-Saat and a truncated arch in Shah Abolghasem.

3.5. Studies performed on the physical characteristics of the entrances of the main passages of the research areas

It seems that the type of space constraint is vertical and in the entrances of the Vaqt al-Saat locality, is from 3 meters to 7 meters high and 3.30 to 6.15 wide and enter the locality from both sides with a crescent-shaped arch and from the other two entrances through the commercial and public space. At the entrances of Shah Abolghasem locality, the height is 5 meters and the width of the skin is from 2.5 to 4.6, and the skins are simple but on one side with a truncated arch.

At the entrances of Sahl Ibn Ali locality, the height varies from minimum 4 to maximum 7 meters and the width of the entrance varies from 1.72 to 4.70, and from 4 entrances, two entrances enter the locality from public and commercial spaces. Input coverage is monotonous and opaque in 60% of inputs and varied and opaque in 40% of inputs.

After the investigations, the properties of materials and colors identified in the square entrances of localities in the table 7 and Fig. 6. And at the entrances of the locality passages in the table 8 and Fig. 7 has been summarized.

Table 7: Properties of materials and colors identified at the entrances of localities Square

Percentage	Color Identification Code (RGB)	Color	The main materials of the inputs
43	199 – 152 – 106		Bright Thatch
30	194 – 154 – 119		Dark Thatch
11.5	251 – 216 – 150		Bright Brick
10	192 – 154 – 115		Dark Brick
4	255 – 255 – 255		Plaster
0.5	187 – 215 – 216		Bright Tile
1	114 – 116 - 182		Dark Tile

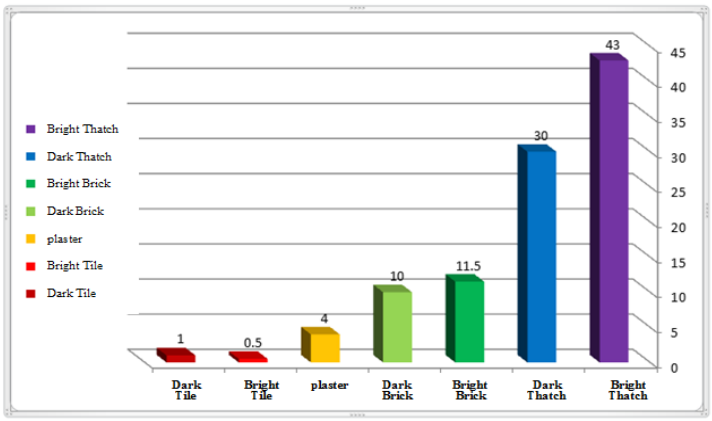


Fig. 6: Share of types of materials used in the entrances of localities Square

Table 8: Properties of materials and colors identified at the entrances of localities passages

Percentage	Color Identification Code (RGB)	Color	The main materials of the inputs
43	223 – 169 – 122		Bright Thatch
30	194 – 154 – 119		Dark Thatch
11.5	251 – 216 – 150		Bright Brick
10	192 – 154 – 115		Dark Brick
4	187 – 215 – 216		Bright Tile
0.5	114 – 116 - 182		Dark Tile
1	28 – 27 - 25		Metal

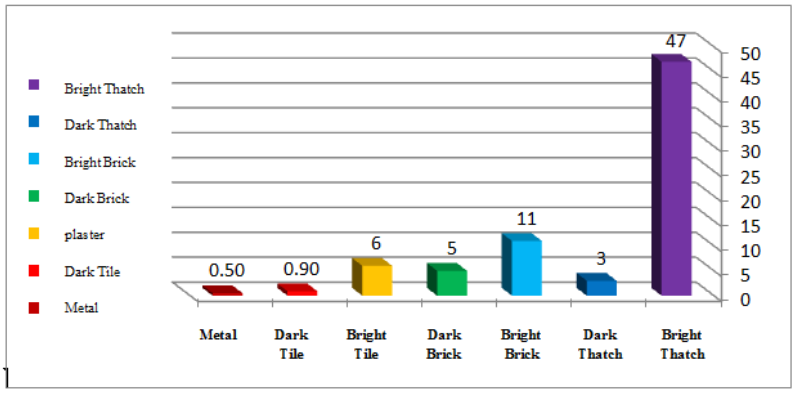


Fig. 7: Share of types of materials used in the entrances of localities passages

Table 9: The physical components of the entrances of Yazd localities

Entrance: One of the physical components	Factors influencing the definition of space personality						Space constraint	Type of cover
	Dominant form Entrance	Entrance Position	Color & RGB	Materials Dominant	Entrance Dimensions			
					Width	Height		
Result	Generally with a small width and has a sabbat with a truncated and crescent arch and an average height of 3.5	Sabat with a truncated arch with a height of 3.9 in Shah Abolghasem and in Vaqt al-Saat with a crescent arch and a height of 3.2	-169-122 223 -216-150 251 -255-255 255	73% Thatch 21.5% Brick and 4% Plaster	In Shah Abolghasem, the average is 2.6 meters and in Vaqt al-Saat the average is 3.3 in Sabat Dara and 2.2 in the other two .entrances	In Shah Abolghasem, each of the three entrances has an average of 3.9 meters, and at the Vaqt al-Saat, two entrances with an average of 7 meters and two entrances along the average passage wall of .5.2 meters	Vertical	Monotonous and opaque

3.6. Analysis of physical components of the entrances of localities in Yazd

According to the comparison and analysis of the tables given here, it seems:

- The average ratio of the height of the squares to the entrances is 1.22 times.
- The average ratio of skin width in the fields to the entrances of the passages is 11.66, and to the entrances of the fields is 12.96 times.

• The materials used in the skins are mostly thatch and brick, in the entrances 73% of thatch and 21.5% of bricks and with small percentages of materials such as wood, glass, metal and tile have also been used.

• The predominant color of the input shells is RGB 199-152-106, 194-154-119.

• The materials used in the floor of the entrances are mostly stone (10 * 10) 45%, rubble 23%, brick 23%.

• The predominant color of the floor is RGB 169-156-137 and 146-134-118.

• In the entrance to the squares on the northern front of Sabat with a truncated or crescent arch with an average height of 3.5 meters is located at the entrance to create shade.

• The entrance of each plot in the skin of the squares is often one step above the floor of the square and has a truncated arch in Shah Abolghasem Square and in Vaqt al-Saat a crescent arch and in some cases a truncated arch. Plots entrances in locality passages are 50% level with the floor, 26% two steps higher and two steps lower than the floor in 24% of cases

4. Conclusions

Climate stability has a lot to do with physical components on the one hand and quality components on the other. Hence, paying attention to the body of the locality in a sustainable city is a priority. In order to achieve a stable situation in the climate of a locality, its physical components must be compatible with the climate. In this research, the physical components of the entrances of locality passages in Yazd city with arid climate have been studied. After reviewing, analyzing and evaluating, the results were obtained that can be considered in the design of locality skins to achieve climate sustainability. The principles of organizing urban spaces in the passages and squares of the present study areas were also quite evident, especially the principle of enclosing space, which is quite noticeable in the bodies around the squares of the research areas, and has static field and dynamics in the passages and has proportions between scales. The space and the surrounding buildings are of human scale and the passages are covered in the passages or entrances to the squares. According to them, the ratio of the height of the bodies of the buildings to the width of the passage was 4 to 1 or more, which created the characteristic of enclosing the space. The principle of different spaces was applied by widening and narrowing the space in squares and passages in these localities, and in some spaces, by closing it, shadows were created by the walls and arches. The principle of the territory in the subject area of the present study (public area, passage and square), despite the differences in level or dimensions of the screw or the creation of bridges (Sabat) is well evident. In this study, the physical criteria of arid climates that have dynamic and interconnected locality centers were examined. Is:

• The organic shape of the passages and the protection of pedestrians from annoying winds

• Shading of high walls around passages

• Low width and human scale

• Visual cohesion and unity in terms of shape, color and type of materials

• Construction of Sabat and attention to its bioclimatic impact

In addition to the physical components such as dimensions, materials, color, dominant form, type of coating, etc., the items mentioned were mentioned in the previous sections of the research.

Considering such patterns and proportions that govern the architecture of the entrances of our urban localities in the past and have been quite successful and compatible with the climate of their region, it is appropriate to use these characteristics and patterns in contemporary architecture to form a new approach in architecture appropriate to the type of climate. Finally, it is recommended that the proportions and patterns of open spaces exterior coverage to be examined in other climates of Iran, including: hot and humid, temperate and humid and cold and dry, in future research to obtain appropriate patterns of those climates to take effective steps to solve the today's problems of architecture and urban planning.

5. Author Contributions

R. Mesgaran Kermani is the first author, main researcher and author of the discussion, whose writing share is 50%. S. M. Mofidi Shemirani

is the second author, research assistant and author of the main discussion, whose writing share is 30%. N. Nikgadam is the third author and statistical analyst whose writing share is 20%.

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7. Conflict of Interest

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

References

1. Agustín Candanedo Ibarra, J., (2011). Design with energy in mind: toward a low load and high satisfaction civic architecture in the great lake basin (master). Waterloo (313 pages).
2. Akhtar kavan, M., (2012). Regulation of conditions compatible with the environment and climate of Iran. Kalhor Publications, Tehran (231 pages).
3. Albatayneh, A.; Alterman, D.; Page, A.; Moghtaderi, B., (2016). Assessment of the Thermal Performance of Complete Buildings Using Adaptive Thermal Comfort. Elsevier (6 pages).
4. Ascione, F.; De Masi, R. F.; De Rossi, F.; Ruggiero, S.; Vanoli, G. P., (2016). Optimization of building envelope design for nZEBs in Mediterranean climate: Performance analysis of residential case study. Elsevier (20 pages).
5. Atarod, F.; Kashi, H., (2017). Elements of urban facades and shells. Armanshahr Journal of Architecture and Urban Planning, No. 21 (19 pages).
6. Buzasi, A.; Palvolgyi, T.; Szalmane Csete, M., (2021). Assessment of climate change performance of urban development projects – Case of Budapest, Hungary. International Journal of Management Cases, No. 18 (9 pages).
7. C. Graham, P., (2012). The parametric façade optimization in Architecture through a synthesis of design, analysis and fabrication (Master). Waterloo (160 pages).
8. Camyabi, S.; Ahmadi, A., (2013). Investigation of Thermal Comfort Indices of Buildings in Mashhad. National Conference, Conference on Architecture and Urban Planning and Sustainable Development with a focus on indigenous architecture to sustainable cities (20 pages).
9. Darabi, H.; Jafari, A.; Akhavan Farshchi, K., (2016). Analysis of climate change trends in Qom province and its consequences. Journal of Environmental Science Studies, No. 2 (15 pages).
10. Felix, M.; Elsamahy, E., (2017). The Efficiency of Using Different Outer Wall Construction Materials to Achieve Thermal Comfort Various Climatic Zones. International conference of renewable energy (11 pages).
11. Hadianpour, M.; Mahdavinejad, M.J.; Bemanian, M.R.; Haghshenas, M.; (2014). Capacity measurement of using double-walled shells in the design of arid climate architecture of Iran in order to reduce energy consumption (case study of Yazd city), Fine Arts Journal (10 pages).
12. Hamdaoui, S.; Mahdaoui, M.; Allouhi, A.; El Alaiji, R.; Kousksou, T.; El Bouardi, A., (2018). Energy demand and environmental impact of various construction scenarios of an office building in Morocco, Clean Energy Journal (11 pages).
13. Hatami Varzaneh, E.; Amini, M.; Bemanian, M. R., (2014). Impact of Hot and Arid Climate on Architecture (Case Study: Varzaneh Jame Mosque). International Conference of Advanced Technologies. Case study (7 pages).
14. Korniyenko, S., (2015). Evaluation of Thermal Performance of Residential Building Envelope. Elsevier (6 pages).
15. Krim, M., (2012). Effect building morphology on energy and structural performance of High-Rise office buildings (Ph.D.). University Of Massachusetts (150 pages).
16. Lashkari, E.; Khalaj, M., (2011). Principles of Urban Sustainability in Hot and Dry Climates in Indigenous Architecture of Iran and Its Impact on Sustainable Architecture. Ganj Honar Publications (134 pages).
17. Leo Samue, D. G.; Dharmasastha, K.; Shiva Nagendra, S. M.; Prakash Maiya, M., (2017). Thermal comfort in traditional buildings composed of local and modern construction materials. International sustainable environment Journal (12 pages).
18. Marion Rose, B., (2011). A study of predictive control strategies for optimally designed solar homes. Concordia University, Montreal, Quebec. Simulation (ESP, Energy plus) (313 pages).
19. Mofidi Shemirani, S. M.; Moztarzadeh, H., (2015). Evaluation of physical criteria of sustainability in urban neighborhoods (based on the hot and dry climate of Iran), scientific-

research. Armanshahr Journal of Architecture and Urbanism (15 pages).
20. Nilsen, H. G., (2006) Natural Ventilation Climate Design Guide for Warm Areas. Nashre khak Publications (128 pages).
21. Pakzad, J., (2018). Theoretical foundations and urban design process. Shahidi Publications, Tehran (234 pages).
22. Pakzad, J., (2018). Urban Space Design Guide. Shahidi Publications, Tehran (472 pages).
23. Pordeihimi, Sh., (2011). Climatic Language in Sustainable Environmental Design. Volume 1. Shahid Beheshti University (304 pages).
24. Pordeihimi, Sh., (2011). Climatic Language in Sustainable Environmental Design. Volume 2. Application of climatology in architectural planning and design .Shahid Beheshti University (323 pages).
25. Rezaee, M.; Vasigh, B., (2014). Sustainable Architecture Analysis. Tahan Publications (198 pages).
26. Sharifian Bar Forosh, Sh.; Mofidi shemirani, M., (2014). Criteria of eco-city structure Theorists' point of view, scientific-research. Bagh-e-Nazar Magazine (10 pages).
27. Singary, M.; Mofidi Shemirani, M.; (2010). Investigating the Effective Patterns in Designing Contemporary Neighborhoods with an Approach to the Concepts of Sustainability. Scientific Research. Journal of City Identity (8 pages).
28. Tavasoli, M., (2012). Construction of city and architecture in hot and dry climate. Center for Urban Studies and Architecture Studies and Research (235 pages).
29. Tavasoli, M.; Berkshlo, M.; Bonyadi, H.; Momeni, N., (2007). Design in the old context of Yazd.second edition. Center for Urban Planning and Architecture Studies and Research (287 pages).
30. Thirunavukarasu, A.; Fazio, P.; Ge, H.; Athienitis, A., (2015). Performance Assessment Protocol for Pre-Engineered Manufactured Self-Sustaining (PEMaSS) Housing to Remote Regions. Elsevier (5 pages).
31. Vertal, M.; Zozulak, M.; Vaskova, A.; Korjenic, A., (2018). Hydrothermal initial condition for simulation process of green building construction. Energy and Buildings (10 pages).
32. Yavari, M., (2014). Achieving a Sustainable Neighborhood Model in New Cities of Iran (Case Study: Baharestan New City). Isfahan University of Arts (201 pages).
33. Zhun, Y., (2012). Mining hidden knowledge from measured data for improving building energy performance (P. h. D). Concordia University, Montreal, Quebec (192 pages).