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Lifelikeness of Boroujerdi's House in Kashan

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Abstract

This study evaluates the lifelikeness layers of Boroujerdi's House in Kashan as a case study to analyze the houses of Islamic period, especially Qajar era. Why traditional Iranian architecture was considered as sustainable architecture? What are the elements included in the traditional architecture to take the most advantage of the least facilities? What elements does the modern architecture lack? This analysis contributes to evaluation of houses and higher sustainability of the architecture, The significance of research on lifelikeness is concentration of sustainable architecture and optimal utilization of environment which is deteriorating due to misuse. This study suggests a correct utilization of resources by which a new kind of architecture can be adopted; this new architecture was used in the past with low facilities and unfavorable climate conditions. This architecture respected the nature and took the best advantage of natural resources to meet human needs.In this way, analysis of lifelikeness layers by SWOT provides better results for sustainable architecture of houses fitted to deserts. This study is a qualitative and descriptive-analytic study.

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INTRODUCTION

Considering the fact that the Boroujerdi's House is located in Kashan which is a desert area, it is a great example for SWOT analysis of the lifelikeness of Iranian traditional houses which can be one of the elements of sustainable architecture. This provides a new basis of traditional architecture in which the most advantages are taken of natural factors to contribute to the eliminating natural resources and display an optimal coexistence. Lifelikeness architecture contributes to achieve better solutions for sustainable architecture through analysis of buildings, locations or any other elements by 25 layers of architectural layers. Lifelikeness is a subset of sustainable architecture. Considering the current non-renewable resources, sustainable architecture is an important subject which contributes to the optimal utilization of available resources given the analyses of those 25 layers and allows the provision of better and more resources for the future generations.

Problem Statement

What are the elements used in Iranian traditional architecture to match the nature? How are these elements considering the analysis of lifelikeness layers? What are the results of these layers in Boroujerdi's House in Kashan?

Significance

The significance of research on lifelikeness is concentration of sustainable architecture and optimal utilization of environment which is deteriorating due to misuse. This study suggests a correct utilization of resources by which a new kind of architecture can be adopted; this new architecture was used in the past with low facilities and unfavorable climate conditions. This architecture respected the nature and took the best advantage of natural resources to meet human needs.

MATERIALS AND METHODS

The methodology used in this study is applied, descriptive and analytical. This study analyzes the aspects of sustainable architecture in Boroujerdi's House using lifelikeness layers. Documentary and field studies, such as interview questionnaire, are used to collect the required data. With respect to the variables, the questionnaire includes economic, social and environmental questions. Then, the strategic matrix SWOT is driven by setting internal and external factors based on which strategies are developed. Finally, SWOT factors are individually weighted with regard to expert views of experts and interviewees. By further analyses, AHP-SWOT model is used to determine better strategies for intervention in Boroujerdis' house by Expertchoice Software considering the weighted priorities.

Figure.1. Location and DEM of the study area

Background and Location

Kashan

There are 6,500 houses, 40 mosques, 30 schools and more than three hundred graves and holy places in Kashan. The most important mosque with a minaret is located in the Grand Bazaar. Buildings are generally made of raw bricks. There are magnificent bazaar and public baths in Kashan (Mashkooti & Naraghi, n.d.).

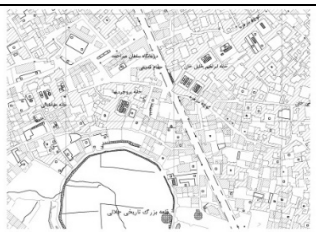
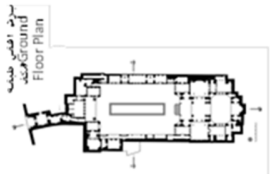
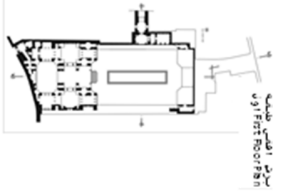
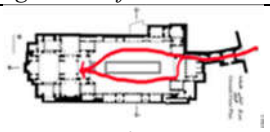
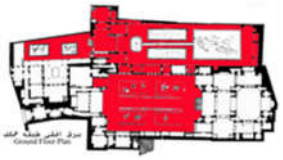
Location of Boroujerdi's House

Boroujerdi's House is a monument of the Qajar era, located on the Alavi Street and Jalali's House. Boroujerdi's House was built in 18 years by Haj Seyed Ja'far Natanzi, one of the reputable merchants of Kashan (1913-1931), who imported goods from Boroujerd. More than 150 artists and builders worked to build the house. Apparently, its architect was Ali Maryam (Molazadeh & Mohamadi, 2007).

RESULTS AND DISCUSSION

The significance of Boroujerdi's house is evaluated by following lifelikeness layers.

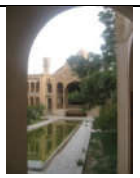
First layer: Climatic-Spatial Layer

Climate: obviously, the violent and militant nature of the central plateau of Iran plays an essential role in introversion of the architecture, as insecure environment requires taking shelter in the maze of cities and neighborhoods. Vision of the hot and sizzling desert is a creation of small but beautiful nature in this maze which requires attachment and extreme attention. The house was built in the form of a garden pit which represents the adaptation to climate of Kashan.	 *Figure 1; reference: ICHO*
Analysis of plan: The inner part of the building is separated from the entrance vestibule by plate number (2), crossing a meandering corridor into the building. The family rested in this part without being disturbed by guests. The inner building is consists of two parts including nine rooms, all located on the ground floor. The inner building is divided into two parts: 1) South part including a backyard, a simple panjdari room, closet, living room and a large cellar. This cellar is the same downstairs great hall at the southern part. The cellar is divided into small and large sections. Small cellars were used for storing food and larger cellars were used for living in summer and very hot seasons. 2) North part including a central yard and a large hall decorated with mirror. There are upper chambers on the two sides of the hall which open toward the great hall. There are two back linings around the great halls. This section includes a hall as well as a kitchen and cellar. The western rooms of this part of the inner buildings intersect the eastern part of the outer yard. Here, most of the rooms are not decorated, while the hall is decorated with mirror (Hamzeloo, n.d.).	 *Figure 2: reference: ICHO*  *Figure 3: reference: ICHO*  *Figure 4: reference: ICHO*
Organization: the building is linearly organized in an array form.	 *Figure 5: reference: ICHO*
Circulation: circulation is not direct in the entrance and ends to important spaces such as yard and the building.	 *Figure 6: reference: ICHO*
Full and empty spaces: The colored space, shown in the figure, is yard which is relative to the full or covered spaces of the building.	 *Figure 7: reference: ICHO*
Transportation layer: It is the public transportation network which is easy to use considering the facilities of Kashan.	

Physical layer: the materials used for the building are locally provided. **Materials used in building**: Materials used in the building include mud brick. Brick, tile, thatch, plaster and paint are also used in decorations. The yard, rooms and corridors are made of brick on the floor and the outer walls of the building and some inner spaces are covered with thatch. Some rooms are covered by plaster on the wall. Inner and outer parts are decorated with convex plaster. A major part of the summer hall or alcove is painted by oil paint (Hamzeloo, n.d.). **Doors and windows**: Doors, fences and windows are completely made of wood; in some cases, decorative fastenings and doornails are used, particularly on the main doors of the inner and outer parts. The main doorframe is rectangular, made of walnut wood with decorative metal doornails and accessories. Vestibule contains a doorknocker. The doorknockers are made for men and women for information, alarm and report. The wooden reticular windows play a pivotal role in air conditioning and lightening the house. Sash windows and openings are usually made of wood and decorated with colorful glasses to avoid the scorching sun and harsh desert climate in summer while lightening the building. **Chemical layer**: utilization of renewable materials for the next generations of buildings in Kashan	 *Figure 8: reference: ICHO*  *Figure 9: reference: ICHO*  *Figure 10: reference: ICHO*  *Figure 11: reference: ICHO*
Simple mechanical layer: windcatchers can be included in the ventilation system of the building. This ventilation takes place naturally with a smart and simple technique.	 *Figure 12: reference: ICHO*
Control layer: This building has the dome-shaped roof, with a skylight on it. There is a large area in the basement in slightly different levels. There are reticulated plates related to windcatchers at the bottom of some walls and niches. This ventilates the air in the basement (Naraghi, n.d.).	 *Figure 13: reference: ICHO*
Self-control layer: The roofs are usually covered by mud bricks in tropical and flat plain of Kashan. In addition, the roofs are often bricked up (which is called floor arch). These buildings with mud-covered and dome-shaped roofs have survived for many years (Naraghi, n.d.).	 *Figure 14: reference: ICHO*

Environmental layer: since Kashan have been lacking rivers and natural springs, people have met their agricultural and irrigational requirements by digging deep aqueducts which sometimes were over 100000m in depth and over 10km in length. Due to its dry weather and rigid soil, Kashan is not favorable for farming and planting trees except by fertilizing and overwatering. On the contrary, Kashan is incredibly convenient for construction; the above factors even increase durability of the building (Naraghi, n.d.).	 *Figure 15: reference: ICHO*  *Figure 16: reference: ICHO*

Second Layer: Illusive-Emotional Layer

Emotional layer: the sense of security and privacy are the most important emotions considered in the Islamic architecture, including Boroujerdi's house.	 *Figure 17: reference: ICHO*
Visual-fictional layer: the architect used the decorations such as beautiful muqarnas, plasterworks etc., to exemplify the heaven. The howz in the yard, even the enclosed yard, seem to surround the sky in a rectangular frame in ground. The vault refers to the unity.	 *Figure 18: reference: ICHO*
Illusive layer: Corridors, cellars and basement do not receive light; therefore, they are cool, particularly in warm weather. Despite this, insufficient light and darkness induces a kind of fear and doubt. As a result, this part of the building is less considered.	 *Figure 19: reference: ICHO*

Third Layer: Analytic-Belief Layers

Economical layer: at the time, only rich people could afford the buildings like Boroujerdi's house; therefore, quality and decorations were chosen considering the economic conditions. Boroujerdi's house, in an approximate area of 1700m^2, consists of two parts, inner and outer buildings. In 1974, the outer building became a property of ICHO, while inner building which is located in the northeast and east of the building is still privately owned (Molazadeh & Mohamadi, 2007). As others said, Boroujerdi's house was previously residential and currently administrative-cultural.	 *Figure 20: reference: ICHO*
Social-Cultural layer: In Kashan, people are Shia and Muslim and very religious. The existence of corridor and vestibule is an example of this belief to provide privacy.	 *Figure 21: reference: ICHO*

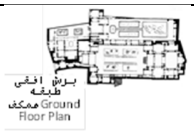
Physical layer and organization: Kashan is the most ancient civilization in Iran. Kashan was first formed organically. Tepe Sialk is a well-known civilization in Kashan. Now, the modern urban system of Kashan is formed considering the key elements, monuments and gardens. Boroujerdi's house is formed linearly in an array form.	
Historical layer: there are many monuments in Kashan. As noted above, Kashan is one of the earliest civilizations. Boroujerdi's house is one of the monuments built in Qajar era. Compared to other cities of Iran (except a few cities in East and West Azarbaijan and Abarqoo in Fars), Kashan has experienced many historical damages and natural disasters such as earthquakes; however, it could maintain many works of Mongol period from seventh, eighth, ninth and tenth centuries (the tomb of Baba Afzal and sanctuary of Ghamsar Mosque), Ağ Qoyunlu period (Meydan Mosque) and the brilliant Safavid period (Finn historic garden, Habib ibn Musa shrine, Vazir Mosque, Mir Ahmad Shrine, the tomb of Pir Davood Ghamsar) and the Qajar period (Soltani school and Boroujerdi's house). Hence, this area can be considered as an ancient treasure of civilization. Moreover, Kashan is famous for its architecture, decorative and manual arts and especially tile industry.	
Analytical layer: in Kashan, people are interested in historic monuments. They embrace and use the traditional architecture and intelligent structure in their new houses; therefore, it can be concluded that people have understood and accepted this type of architecture.	 *Figure 22: reference: ICHO*
Informing layer: people need be informed of historic buildings and their advantages in natural ventilation. The traditional architecture, like dome and brace, is observed in modern architecture. **Moral layer**: only rich people could afford this type of buildings.	 *Figure 23: reference: ICHO*
Creative layer: to avoid extreme heat of summer, cellars and basements with high air windward as well as dirt fans were built as basic requirements of the building. In large buildings, these cellars include several nested platforms and pavilions and multiple corridors (Naraghi, n.d.).	 *Figure 24: reference: ICHO*
Relational layer: The form of the house is attempted to be similar to the surrounding structures and buildings; even with several floors, the building is in the same height as other buildings.	 *Figure 25: reference: ICHO*
Aesthetic layer: Boroujerdi's house has two decorative architecture; one, the overall structure of the building based on sunken garden which is a very beautiful architectural style; the other, decorative structure such as karbandi, muqarnas, tasesazi, yazdibandi, cymatium, and arch as well as decorations of the entrance including tiling, stucco and the interior decorations such as paintings and coloring. There are few decorative tiles, simple bricklaying, very beautiful and exquisite stucco and painting in the outer and decorative mirrors in the inner building (Hamzeloo, n.d.).	 *Figure 26: reference: ICHO*

	 *Figure 27: reference: ICHO*
Legal layer: legally, these buildings and monuments of Kashan are under supervision of ICHO as tourist attractions for public visit. The building, which is currently considered as an ICHO office, has been registered in the national cultural heritage index.	
Belief-fundamental layer: at the time, people believed that the houses should has been constructed in accordance with Islamic learnings. Privacy has been a very important issue which can be seen in this house and similar others. Its unique beautiful decorations represent the wealth of owners.	

Analysis of internal and external factors effective on lifelikeness of Boroujerdi's house:

Weaknesses, strengths, threats and opportunities are obtained with respect to lifelikeness layers.

Internal Factors

Strengths (s)
S1: supervised by the CHO
S2: public visit and ticket for maintenance
S3: interest of residents to the historic architecture
S4: beautiful decorations and architecture
S5: easy access to the building and its location

Weakness (w)
W1: ignorance of the building as a land-use
W2: negligence
W3: distance from the main street
W4: deteriorating materials against natural factors
W5: slow reconstruction of decorations

External factors

(O) Opportunities
O1: location of the building within the traditional neighborhood
O2: high number of visitors, particularly foreign tourists
O3: other surrounding attractions such as traditional hotels
O4: security of the building and surrounding neighborhood
O5: attention of authorities to the building

Threats (T)
T1: lack of proper notification by the maintenance staff
T2: limited time of visit
T3: limited number of visitors in hot and cold weather
T4: existence of more available buildings
T5: deterioration of brick buildings

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Table 1: ultimate weight of strengths (AHP-SWOT)

strengths	S1	S2	S3	S4	S5	relative weight
S1: supervised by ICHO	1	3.8	5.6	3.8	2.6	.230
S2: public visit and ticket for maintenance	26.	1	1.2	1	96	.152
S3: interest of residents to the historic architecture	12.	54.	1	5.4	.5	.198
S4: beautiful decorations and architecture	26.	1	1.2	1	96	.152
S5: easy access to the building and its location	29.	1.1	2	1.1	1	.187

Table 2: ultimate weight of weaknesses (AHP-SWOT)

weaknesses (w)	W1	W2	W3	W4	W5	relative weight
W1: ignorance of the building as a land-use	1	96	1	96	96	124
W2: negligence	1.3	1	1.3	1	1	131
W3: distance from the main street	1	96	1	96	96	124
W4: deteriorating materials against natural factors	1.3	1	1.3	1	1	131
W5: slow reconstruction of decorations	1.3	1	1.3	1	1	131

Table 3: ultimate weight of opportunities (AHP-SWOT)

Opportunities (O)	O1	O2	O3	O4	O5	Relative weight
O1: location of the building within the traditional neighborhood	1	26	.79	26	.79	0.075
O2: high number of visitors, particularly foreign tourists	3.8	1	2.6	1	2.6	0.224
O3: other surrounding attractions such as traditional hotels	92	.28	1	.28	1	0.156
O4: security of the building and surrounding neighborhood	3.8	1	2.6	1	2.6	0.224
O5: attention of authorities to the building	92	.28	1	.28	1	0.156

Table 4: ultimate weight of threats (AHP-SWOT)

Threats (t)	T1	T2	T3	T4	T5	Relative weight
T1: lack of proper notification by the maintenance staff	1	2.6	3.8	3.8	2.6	213
T2: limited time of visit	29	1	1.1	1.1	1	184
T3: limited number of visitors in hot and cold weather	26	96	1	1	96	106
T4: existence of more available buildings	26	96	1	1	96	106
T5: deterioration of brick buildings	29	1	1.1	1.1	1	184

Table 5: Ultimate priority matrix of SWOT intergroup factors for optimized utilization of bazaar

SWOT intergroup factors	**Ultimate priority**	**Order**	**Cumulative priority**
S1: supervised by ICHO	230	1	1
S3: interest of residents to the historic architecture	198	2	2
S5: easy access to the building and its location	187	3	3
S2: public visit and ticket for maintenance	152	4	4
S4: beautiful decorations and architecture	152	5	5
W2: negligence	131	1	6
W4: deteriorating materials against natural factors	131	2	7
W5: slow reconstruction of decorations	131	3	8
W1: ignorance of the building as a land-use	124	4	9
W3: distance from the main street	124	5	10
O2: high number of visitors, particularly foreign tourists	224	1	11
O4: security of the building and surrounding neighborhood	224	2	12
O3: other surrounding attractions such as traditional hotels	156	3	13
O5: attention of authorities to the building	156	4	14
O1: location of the building within the traditional neighborhood	0.075	5	15
T1: lack of proper notification by the maintenance staff	213	1	16
T2: limited time of visit	184	2	17

T5: deterioration of brick buildings	184	3	18
T3: limited number of visitors in hot and cold weather	106	4	19
T4: existence of more available buildings	106	6	20

Source: The author

Priorities

S1: Supervised by ICHO (ultimate weight: 230)
S3: Interest of residents in the historic architecture of the city (ultimate weight: 198)
W4: Slow reconstruction of decorations (ultimate weight: 131)
O2: High number of visitors, particularly foreign tourists (ultimate weight: 224)
O4: Security of the building and the surrounding historic architecture (ultimate weight: 224)
T1: Lack of proper notification by the maintenance authorities (ultimate weight: 213)
T2: limited time of visit (ultimate weight: 184)

Conclusions and Solutions

These solutions and results are presented to improve the lifelikeness of Boroujerdi's house. The presented strategies are evaluated in four offensive, diversity, reviewing and defensive strategies.

1) Offensive/competitive strategy (SO): according to this strategy which is based on internal strengths and external opportunities,

- The building is supervised by ICHO; therefore, it receives the required facilities. The score is better than the time when the building was privately owned.
- Boroujerdi's house is located in a popular historical neighborhood.

2) Strategy (ST): It provides strategies with regard to internal strengths and external threats.

- Valuation of the bazaar and representation of advantages and values of the traditional bazaar of Zavareh under full supervision of ICHO and its restoration
- To provide more time for visiting many buildings existing there

3)Reviewing strategies (WO): This strategy eliminates weaknesses by taking advantage of external opportunities. In fact, it is a strategic review of previous activities.

- This building is located in a good historical neighborhood which is safe because of the surrounding stores and hotels; therefore, time of visit can be increased for better economic productivity.
- Considering the popularity of the building, it can be more attractive by providing better decorations.

4) Defensive strategies (WT): this strategy emphasizes on weaknesses against external threats.

- Since the authorities have been less concerned, decorations take longer.
- Limited time of visit reduces the income and reconstruction of the building.

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