Assessing Sustainable Local Identity in the Commercial Centers with an Emphasis on Biophilic Design (Case Study: Shiraz Enghelab Bazaar)

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Abstract

The innate tendency of humans towards nature has made them pay specific attention to this issue in different fields, and particularly architecture. This study was conducted to recognize common components of biophilic architecture and local architecture and analyze their impacts on helping designing something with sustainable local identity. As the local identity of an architectural work can play a key role in creating new works, emphasizing common components of local and biophilic design can help not only the sustainability of work but also the physical and mental health of individuals. In this applied research, research questions were answered using architectural design models in combination with biophilic design components affecting space localization. Data collection was done using the library method, field observations, and using a questionnaire. After analysis of the questionnaires, common components of local and biophilic architectures were introduced. Then, the data were measured in Shiraz Enghelab Bazaar as a sample business center the results showed that in terms of the effect of all common components of local and biophilic architecture on the local identity of a business center, three components including nature-environment harmony, natural facilities of the environment, and climatic conditions had the most effect on the sustainable local identity of a business center respectively.

Keywords: Local Identity; Business Centers; Biophilic Design; Shiraz Enghelab Bazaar

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1. Introduction

Environment design based on similarity to natural elements is known as biophilic architecture. Biophilia is the reflection of human's enthusiasm to communicate nature. The relationship, especially in the current world due to modern and urban life, has been distorted severely. The concept of biophilia explains the interests of humans to watch natural landscapes, hearing the sound of sea waves, seeing birds and wildlife, and so on. The basic hypothesis in the biophilic architecture is on the said basis. The hypothesis expresses that creating architectural spaces in such a way that reminds content of natural components can leave positive effects on the mind, emotions, feelings, and mental health of humans (Söderlund and Newman, 2015).

In the present study, library investigations have paved the way first to discuss the issue and make a research question. In this field, the references are specified after determining the research objective. Then, the statistical data and field references have measured the research hypothesis on the identity of local architecture in Shiraz Enghelab Bazaar based on biophilic design components.

This study aimed in achieving some components of the biophilic architecture, which can affect the sustainable local identity of a business center, so that they can be used not only to design an architectural work with local identity with environment-friendly components, but it can also emphasize mental health of the users.

The statement of the problem in this study helps going beyond physical forms of local architecture and identify other dimensions of architecture, such as biophilic architecture, in terms of identification of public spaces to create local identity in the business centers.

Also, this study tends to answer the following research questions:

- What are the common components of biophilic and local identity approaches in commercial centers?
- How much common biophilic and local components effect on domestic identity of commercial spaces?

According to the research questions, the hypotheses are:

- It seems that measurement of biophilic components in the localization of a business center can help the achievement of common components for local architecture and biophilic architecture for space identification.
- According to the field investigations and statistical analysis, the effect of all common biophilic local components can be seen and measured on domesticizing the Shiraz commercial centers such as Enghelab Bazaar.

2. Literature Review

Human has been depended on nature for all his needs hence there had been a deep connection between human and nature. However, in modern days, when industry has spread its influence on human life mainly after industrial revolution, this connection has been weakened. Human was leading to depend on man-made industry in industrialized cities rather than pure nature; hence he had been gradually alienated from nature.

No one would reject the fact that human have been completely dependent on nature throughout the history of his life on the Earth (Mohammadi Moghadam, Singh, and Yahya, 2015).

Growing body of scientific study, beside nature and human beings, increasingly reveals that most of our inherent tendencies to affiliate with nature continue to exercise significant effects on people's physical and mental health, performance, and wellbeing (Kellert and Calabrese, 2015).

Today, regarding the various settings and experiences of our lives, we should be able to find characteristics that would have improve our chances of survival. The natural world keeps us healthy and helps promote the physical performance as well (Almusaed, 2011).

Biophilic architecture is a part of an innovative view in architecture, where nature, life and architectural estimation merge to create a lively habitable structure fit to satisfy the demands, restrictions and respect for both people and the environment (Almusaed, 2011).

The innate tendency of humans towards communicating the nature and considerable effects of communicating the natural environment on the soul and body of humans has made people seek a logical and appropriate relationship between inside and outside spaces. Today, the physical and mental need of humans to communicate nature has made all societies be considered as cultural heritage (Mahdinejad et al., 2015).

2.1. Biophilia and Biophilic Design

The term "Biophilia" was used for the first time by a psychologist called Eric Fromm and was generalized later by a biologist called Edward Osborne Wilson. The word, which is originated in biology and psychology, and is evolved in neurology and architectural sciences, refers to the tendency of humans toward nature and natural systems (Aref and Taheri, 2015).

Stephen Kellert has introduced biophilic design as an updated innovation, the structure of which is designed over history (Kellert, Heerwagen, and Mador, 2008) (Fig 1).

In summary, biophilic design is the identification of the innate need of humans to communicate nature, along with sustainability and international strategies of designing environments to enhance the quality of life (Pollack, 2006: 37).

One of the main objectives of biophilic architecture is returning man to nature. This kind of architecture tries to eliminate the conflict between man and nature. Biophilic architecture wants not only to connect man to nature physically but also is aimed at connecting man to nature mentally. This is design and construction based on the nature in the mind (Taheri and Tahmasbi, 2015).

Biophilic design is an effort to remove the gap between modern architecture and the needs of humans to communicate the natural world. Biophilic architecture is a heuristic approach emphasizing the significance of maintaining, enhancing, and restoring the useful experience of using nature in manmade environments (Pollack, 2006).

Biophilic encompasses two approaches of direct and indirect use of nature (Kellert, Heerwagen, and Mador, 2008). The two approaches have been classified by Kellert et al in 6 ranges including natural patterns and processes, natural forms and shapes, environmental features, light and space, place-based relations, man-nature relationship evolution, and biophilic design elements (Bitaraf, Habib, and Zabihi, 2017) (Table 1).
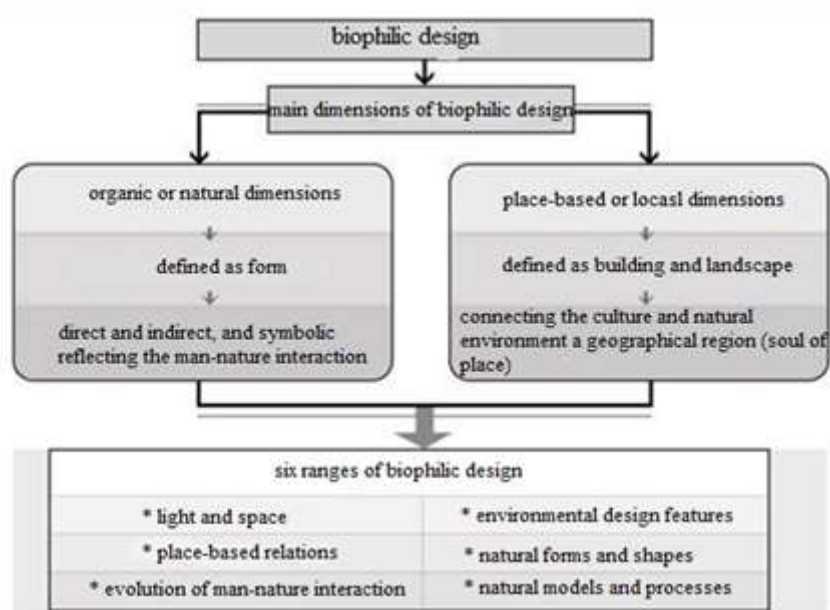
Fig 1 Biophilic design (Source: Authors)

Table 1 Biophilic variables (author with a focus on kellert biophilic elements)

	Biophilic features	Main characteristics of Biophilic Architecture
1	Environmental features	Light, air, water, plants, animals, fire, natural materials, …
2	Natural shapes & forms	Images of nature, natural colors, animal and plant motifs, arches, domes, simulation of natural features, biomimicry, …
3	Natural patterns & processes	Sensory variability, age, change, patina of time, growth, transitional spaces, dynamic, balance, fractals connection of properties in nature with the built environment
4	Natural spatial relationships	Spaciousness, spatial variability, space and shapes and form, spatial harmony, inside-outside spaces, …
5	Place-based connections	Geographic connections, historic connection, ecological and cultural connections to place and local materials, landscape ecology, no place lessness, suitable for geographic context
6	Human-nature connections	Prospect and refuge, order and complexity, affection and attachment, attraction and beauty, focus on aspects of the inherent human relationship to nature, …

2.2. Local Identity of Architecture

Concerning the nature-based approaches in architecture, one can refer to multiple cases such as reference to habitat wisdom (Bitaraf, Habib, and Zabihi, 2017). According to the approaches towards local architecture in various references, and definitions of these approaches for the local architecture, four determinant factors for local architecture can be considered as the same generators of sustainable development: nature, humans (society), construction, and model. Hence, according to the degree of significance of each factor in different approaches towards local architecture, different definitions can be provided for the local architecture (Akrami and Damyar, 2017).

The investigations on local architecture show that titles such as identity, tradition, and structure are the most underlying factors in the field of local architecture, and using that in contemporary architecture. Although local architecture has been changed a lot over history, it has preserved its special identity (Mulanaei and Soleimani, 2016).

The local architecture is sometimes defined on this basis that has been created by humans, and experts have not interfered. Hence, local architecture speaks about a certain local culture, which has been created by the people of the same region, and has been grown and has been affected under difficult events. Although popularity and popular construction and language in local architecture is the common point of the majority of definitions, two different types of definition with different uses are created in terms of communicating the nature, and that material aspect or conceptual concept of the natural facilities are preferred (Akrami and Damyar, 2017) (Table 2).

Table 2 Vernacular architecture (Source: Author)

	Vernacular features	**Main characteristics of Vernacular Architecture**
1	Cultural characteristics of societies	Compatible with local culture of society
2	Relevant with climatic conditions	Wind, light, solar radiation, humidity, air movement, temperature, rain, …
3	Local materials	Using local materials, using accessible materials
4	Social and economic facts of the community	Compatible with economy and culture of its society
5	Coordinate with natural environment	Topography, easily integrate with nature, low environmental impacts
6	Bringing back the reflection of events to life in social memory	Let the social occurrence to be kept on mind
7	Durability &versatility	Durable materials, durable designs, easy and functional designs

As local architecture is qualified to be interconnected to nature, it can gain timeless quality, which is attributed to nature with the timeless man-nature connection. In the local societies, there is deep harmony between the man and buildings. Falamaki has referred to the popularity of local architecture, and has counted two types of environments as the main characteristics of local architecture:

"Connection to the cultural environment or cultural values, with cultural behaviors, and with the implicit regulations in it on one hand, and connection to the natural environment or the dataset provided for human by the land on the other hand" (Akrami and Damyar, 2017).

When the features of vernacular architecture and biophilic design parameters are reviewed, it is clear that there are common values in terms of design criteria. In vernacular architecture, the building and its environment is designed to meet all human needs by using the opportunities and the possibilities offered by nature. The designer/constructor/user tries to eliminate every single detail that could adversely affect his life. As a natural result of this process, vernacular buildings involve the values of today's concept of sustainability (Murakami and Ikaga, 2008) (Table 3).

Table 3 Common Features of Biophilic and Vernacular Architecture (Source: Author)

Common features of Biophilic & Vernacular design	Architecture	
	Characteristics	**Examples**
Environmental features	Lights, air, water, plant, animals, fire, etc.,	Using natural light, water pond and fountain, pools, natural greenery and plants, domestic animal (fish, birds, …)
Natural materials & colors	Local and natural materials, accessible materials, natural colors	Using, natural materials such as wood, clay, brick, stone, natural colors which comes from nature
Relevant with climatic conditions	Geographic connections, wind, light, solar radiation, humidity, air movement, temperature, rain, ...	Sustainable design, using natural energy and sources, design based on climatic conditioned trying to use natural controlling Systems
Coordinate with natural environment	Topography, integration with nature, low environmental impacts, landscape ecology, suitable for natural context	Contextual thinking, harmonized with the site, protecting and preserving the land
Durability & versatility	Durable materials, durable designs, easy and functional designs, age, change, growth, patina of time	Using durable and local material, using different natural textures, materials with age showing features such as Copper, brick, ….
Natural forms & patterns	Arches, domes, simulation of natural features, natural motifs	Forms which come from natural system and patterns, using natural motifs with nature ideas
Economic facts of the community	Compatible with society's economy	Using local materials and designs, designing with cultural look to the context
Social & cultural connections	Compatible with local culture of society, let the social occurrence to be kept on mind	Focusing on cultural look of the society, upgraded look to the traditional design of the context

2.3. Commercial Centers

Commercial centers play various roles such as political, social, religious, relational, economic, and cultural roles, the combination of which gives soul to this space. The commercial spaces play a key role in the creation of new urban spaces as one of the most important urban uses, along with urban economy development (Sarvar, Salahi Sarikhan Beiglu, and Mobaraki, 2017). These spaces have been considered as one of the emerging and growing phenomena in Iran (Azizi and Asadi, 2017).

Not only gaining income and economic issues should be considered in commercial spaces, but also different approaches and continuous plans should be taken to be responsive to a wide range of the society. These spaces are used by different age groups, can play a key role in growth, prosperity, and generation of culture, and pave the way for the mental health of citizens (Bahmani Kazerooni, and Pourjafar, 2014).

Bazaars of different cities were not equally important. Some of the cities which were located alongside trading routes (like Silk Way) had a greater bazaar, and the others which were distant from these routes had a weaker bazaar. Therefore, some act as an international bazaar (Moosavi, 2004) (Table 4).

Table 4 Bazaar Types (Source: Moosavi, 2004)

Types of Bazaars in the cities of ancient Iran	
Periodic Bazaar	-With no special architectural space. -Organized everywhere and in known intervals (weekly, monthly etc.). -Could be done in every part of the city or village. -Usually, an outdoor space Note: This kind of bazaar has lost its importance by the passage of time and the change of social conditions
Urban Bazaar	-Accommodate commercial activities as well as social and cultural activities of people -A covered public passageway which is surrounded by shops and stores in two sides. -A place for shopping, walking, social dialog, and cultural interaction of people.
Local Bazaar	-Smaller type of urban bazaar -Allocated to a particular area or district of the city or town -Its architectural characteristics were similar to urban bazaar -composed of fewer shops and stores

2.4. Case Study: Shiraz Enghelab Bazaar

The common biophilic and vernacular variables were studied in Shiraz different commercial spaces, and from those spaces Enghelab bazaar was selected as it had more than half of the variables.

Table 5 Features of biophilic & vernacular variables in Enghelab bazaar (Source: Author)

	Environmental features	Natural materials & colors	Relevant with climatic conditions	Coordinate with natural environment	Durability & versatility	Natural forms & patterns	Economic facts of the community	Social & cultural connections
Enghelab Bazaar	◐	◐	◐	◐	◐	◐	◐	◐

Enghelab Bazaar is located in the distance between Bagh Safa bypass and Meshkinfam Street in the southern dimension of Shiraz Azadi park. One of the clearest characteristics of this bazaar is its special location. The main purpose of the establishment of Enghelab Bazaar has been to provide a local market for the residents of surrounding neighborhoods. Hence, Enghelab Bazaar is located in limited spaces near the Khoshk River (Askari, 2019) (Fig 2).

Fig 2 Place situation

Although a small space is considered for this bazaar, the place was changed into a large market over time and following the considerable welcoming by local people. Through creating an additional section in front of the bazaar, space was provided for business and wide expanded commerce. As it was mentioned, Enghelab Bazaar was activated as a neighborhood market at the first. Hence, urban planning to build different stores of the bazaar was done on this basis. Therefore, the architecture of the bazaar is like a local market; although it has wide expanded dimensions. This has resulted in the most underlying aspects of differentiation of Enghelab Bazaar from other shopping centers in Shiraz (ibid).

According to the field investigations, it seems that the studied bazaar has been established under the supervision of the municipality and by the bazaar cooperation with not predesigned architecture in the said place for the welfare of retailers of the region. The stores in this center have been formed in network form. The semi-roofed corridors of the bazaar, along with the pause paces specified by gardens, have created special variety in the space. Despite the weaknesses including urban pollution, lack of appropriate infrastructures, lack of rich architecture, and inadequate materials, the complex has some strengths, which can make a hopeful future (Fig 3). According to the mentioned

characteristics of the Shiraz Enghelab Bazaar and analysis of common biophilic-local components in this space, it seems that some components are neglected; although they are capable to be used in this space. This issue has been investigated in the rest of the paper (Fig 4).

Fig 3 Enghelab bazaar aerial view (Source: Google map)

Shiraz Enghelab Bazaar		
Functional components	Aesthetic components	Environmental components
• Suitable roadway access • Flexibility of urban edges • Existence of major green space (Azadi Park) • Existence of river • Active and live fabric in daytime • Multi-storey car parking	• Existence of spatial openness • Almost similar dimensions and proportions of uses (Dardasht Daneh)	• Wide and sustainable vegetation • Shading by pedestrian crossings as a result of wide vegetation • Existence of visual landscapes
• Using local patterns • Adjacency to Homa Hotel • Trans-neighborhood uses in the main street edge • Possibility of pedestrian axis empowerment	• Adjacency to greenspace and river, and modeling them as natural contextualism • Fabric renovation	• Adjacency to major greenspace, such as Azadi park • Adjacency to river • Allocating some part of each adjacent use to greenspace

Fig 4 Enghelab bazaar Components (Source: Authors)

3. Methodology

This study is an applied one and aims in identifying the architectural design models affecting space localization in combination with biophilic design. Then, field and survey studies were used in form of a questionnaire for the data collection and analysis. Before the collection of the main data, an experimental study was done to determine the readiness, ease, and comprehensiveness of the items designed in the questionnaire. The questionnaires were distributed by meeting in place, and some explanations were provided for 35 users in Enghelab Bazaar in the age group above 18 years old.

The investigations showed that 10-30 participants were qualified to confirm the reliability and validity of the instrument. Based on the feedback of participants in the experimental study, the time of filling out the questionnaire was appropriate, and questions were easy. Hence, nothing was changed in the final questionnaire.

After experimental analysis, 140 questionnaires were distributed. As this study was aimed at analyzing the opinions of the users of the designed space, the sampling method in this study was simple random sampling. The sample size was considered at 140 people based on the target population and based on an average number of daily users.

According to the research hypotheses, an appropriate statistical test was used in SPSS-24. Statistical analysis of mean value, correlation, Friedman ranking, and Cronbach's alpha were the tests used in this study. The results were analyzed at the error level of 5% (p-value=0.05).

To test the research hypothesis, 21 items were designed in the frame of 8 variables. These items were confirmed by the masters and experts in the field of architectural and environmental psychology theory. Finally, the results were analyzed using SPSS-24.

Cronbach's alpha obtained for research variables and whole questionnaire showed that the research instrument has high reliability, and the results are reliable. Table 2 has presented the reliability scale obtained in this study.

Table 6 Reliability statistics of a research instrument (Source: Authors)

Component	Cronbach's alpha
Environmental facilities	0.852
Natural materials and colors	0.814
Climatic conditions	0.813
Nature- environment harmony	0.849
Durability and flexibility	0.892
Natural form and shapes	0.840
Economic realities	0.835
Social and cultural relations	0.838

3.1. Participants

The demographic information for participants has presented in Table 3. 140 citizens and visitors of Enghelab Bazaar participated in this study including 91 females (71.7%), and 36 males (32.8%). All participants were local people of Shiraz, and the majority of the participants (n=88, 26.4%) had a BA degree. 94 (47%) participants were in the age range of 18-35 years old. 13 participants didn't answer the demographic items.

Table 7 Descriptive statistics of the participants (Source: Authors)

Interviewed groups		Frequency percent
Gender	Male	28.3%
	Female	71.7%
Age	18-35 years old	74%
	36-50 years old	26%
Education	Diploma and lower	2.4%
	Post-diploma	4.8%
	BA	62.4%
	Higher	30.4%

4. Results

What are the biophilic components affecting the localization of business centers?

As the root of the term "biophilia" or "biophilic" returns to the positive emotion and innate connection of man and other live species (Ziyari and Ajza Shokuhi, 2018: 3), the components are defined about the live, dynamic, and natural environment.

Biophilic design on this basis aims in a creative combination of green design with the participation of outside life and gaining investment from the direct and indirect advantages of using nature as functional and conceptual design indicators in daily life (Mirghlami, Medghalchi, Shakibamanesh, and Ghobadi, 2016).

The main patterns of such planning are based on patterns and forms, visual and nonvisual relations, adjacencies, stimulants, and attachment to nature (Ziyari and Ajza Shokuhi, 2018: 5). The patterns are adaptable to local architecture structures of Iran, and the concept of localization.

This study aims to achieve components of the biophilic architecture, which can affect the local identity of a business center so that they can be used not only to design an architectural work with a local identity but also work with nature-friendly components, along with providing mental health for the people. In the questionnaire designing step, and to achieve the best data collection instruments, the introduced components were analyzed in previous studies, and the same scale and type factors were classified. The identification was done based on the repetitiveness of components in the existing references and proposed structures in modeling local design patterns. Table 8 presents the common local and biophilic architecture components, which have been the basis of designing items.

After identification of the main research components, a correlation test was used to understand the correlation of these elements. The correlation test was used to test the significant correlation between two variables. In this test, the type, intensity, and direction of correlation between two variables are measured. If the significance level is lower than 0.05, two variables are not independent and are correlated. However, if the significance value is higher than 0.05, the hypothesis based on the independence of two variables is not rejected, and the variables are independent.

The result of the correlation test showed that considering biophilic design components, and preservation of attachment to the natural and social environment has a significant effect on the local identity of a complex.

Among the introduced factors, durability and flexibility (r=0.788), and harmony with the context and surrounding environment (r=0.708) have shown the highest correlation and direct correlation with local identity. The economic realities and financial situations are less correlated to the localization of architectural environments (r=0.035).

More simply, the financial status and positions play a fewer role in users' understanding of a localized environment compared to other objective characteristics including facilities (r=0.720), materials (r=0.805), and so on. This result is expectable according to the biophilic architecture approach, and biophilic design models. This is because; nature and living things play a vital role in biophilic design.

How much the biophilic components can affect the local identity of Shiraz Enghelab Bazaar?

Shiraz Enghelab Bazzar was analyzed to measure the status of using local-biophilic components in available samples. The reason for choosing this space was its characteristics such as natural elements, the live soul of the environment, considerable daily activities, urban places, and locating micro spaces in harmony with the existing nature and designing regular and complicated routes in combination with natural elements.

Table 5 shows a confidence level of 95%, and the significance level obtained for the majority of variables was lower than 0.05. As significance level of the 5 factors (environmental facilities, materials, climatic conditions, harmony with nature, economic realities, and social-cultural communications) is lower than 0.05, and the mean value is higher than 3, and as the minimum and maximum values are positive, these factors have affected research hypotheses positively. In other words, these components have been used at a desirable level in the studied sample. The component of natural materials and colors, durability and flexibility, and natural forms with a mean value below 3 have not desirable situations from the perspective of the users (Table 9).

Table 8 Common biophilic and local architecture components (Source: Authors)

Common biophilic and local architecture components							
C1	C2	C3	C4	C5	C6	C7	C8
Environmental conditions	Natural materials and colors	Climatic conditions	Environment-nature harmony	Durability and flexibility	Natural form	Economic realities	Social and cultural relations

Table 9 Correlation statistics of biophilic-local architecture components (Source: Authors)

		Environmental conditions	Natural materials and colors	Climatic conditions	Environment-nature harmony	Durability and flexibility	Natural form	Economic realities	Social and cultural relations	Environmental conditions
Local identity	Correlation coefficient		0.720**	0.809**	0.805**	0.870**	0.887**	0.669**	0.530**	0.798**
	Sig		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

The existing situation of these factors doesn't mean insignificance of these components, but also it shows the necessity of considering these factors in the idea-making processes in executive steps to choose applied models. For a better understanding of the status of biophilic architecture components in this complex, box chart in Fig 5.

This schematic is one of the most useful exploratory schematics to compare the mean value of two or more societies. The line dividing the box into two parts is the median. It means the value that distribution of 50% of the data is higher than it, and distribution of 50% of the data is lower than it. As it is observed, the median in the box relevant to harmony with nature is higher than others, which means more satisfaction of users with this factor in the Shiraz Enghelab Bazaar. Also, more kurtosis and distribution of the data in the box relevant to climatic conditions show different ideas of the users. Although the component has gained an acceptable level of users' satisfaction, the value of the satisfaction for some users has been lower than the medium level. Although the majority of users had a satisfaction level higher than the average level in terms of environmental facilities, the majority of them were dissatisfied with the natural form, and durability, and flexibility. It should be also noted that participants were satisfied with social-cultural relations in

Enghelab Bazaar at the level of 100%. The median value in this diagram for this factor was obtained at 3. All data gained value equal to or higher than 3. Finally, the maximum value was obtained by durability and flexibility. Contrary to other factors, it was obtained below the maximum level (5). In other words, no users in any age group and gender were satisfied with this factor at the level of 100%.
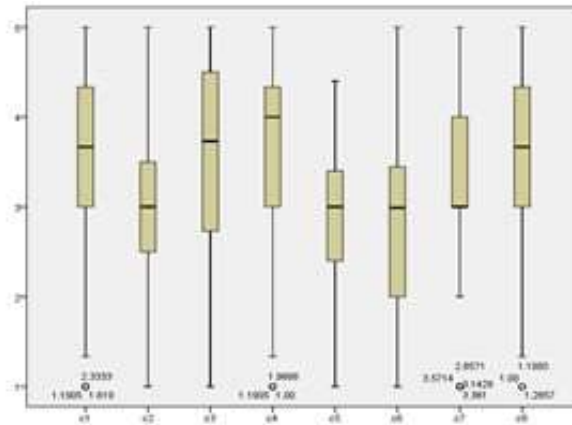

Fig 5 Distribution of the average rank of domestic–biophilic components observed in Enghelab bazaar

4.1. Analysis of Prioritization Factors and Components

The Friedman Test was used to test the sameness of prioritization of some dependent variables by the participants. The results of the test were obtained in form of two data groups. The first one is descriptive statistics showing the mean ranks of every variable. The second one is the Chi-square test, DF, and significance level (Table 10).

As the significant level is below 0.05, the claim on the sameness of rank and priority of variables has been rejected. The results obtained from the Freidman test showed that the priorities in Enghelab Bazaar have been relevant to harmony with nature and environment, environmental conditions, climatic conditions, and social-cultural relations, and other factors have possessed next priorities (Fig 6; Table 11; Table 12).

Table 10 Test the mean value of variables (t-test) (Source: Authors)

	Mean	SD	variance	t-value	df	sig	Mean diff.	Confidence level	
								min	Max
Environmental facilities	3.56	1.07939	1.165	6,175	139	0.000	0.56335	0.3830	0.7437
Natural materials and colors	2.96	0.91385	0.835	0.493-	139	0.623	0.03810-	0.1908-	0.1146
Climatic conditions	3.58	1.07637	1.159	6,389	139	0.000	0.58121	0.4013	0.7611
Nature-environment harmony	3.64	1.01436	1.029	7,523	139	0.000	0.64492	0.4754	0.8144
Durability and flexibility	2.91	0.77260	0.597	1.336-	139	0.184	0.08723-	0.2163-	0.0419
Natural forms and shapes	2.68	1.01317	1.027	3.771-	139	0.000	0.32291-	0.4922-	0.1536-

Economic realities	3.32	1.19360	1.425	3,132	139	0.002	0.31599	0.1165	0.5154
Social and cultural relations	3.57	0.98602	0.972	6,785	139	0.000	0.56542	0.4007	0.7302
Local identity	3.58	0.93206	0.869	7,327	139	0.000	0.57717	0.4214	0.7329
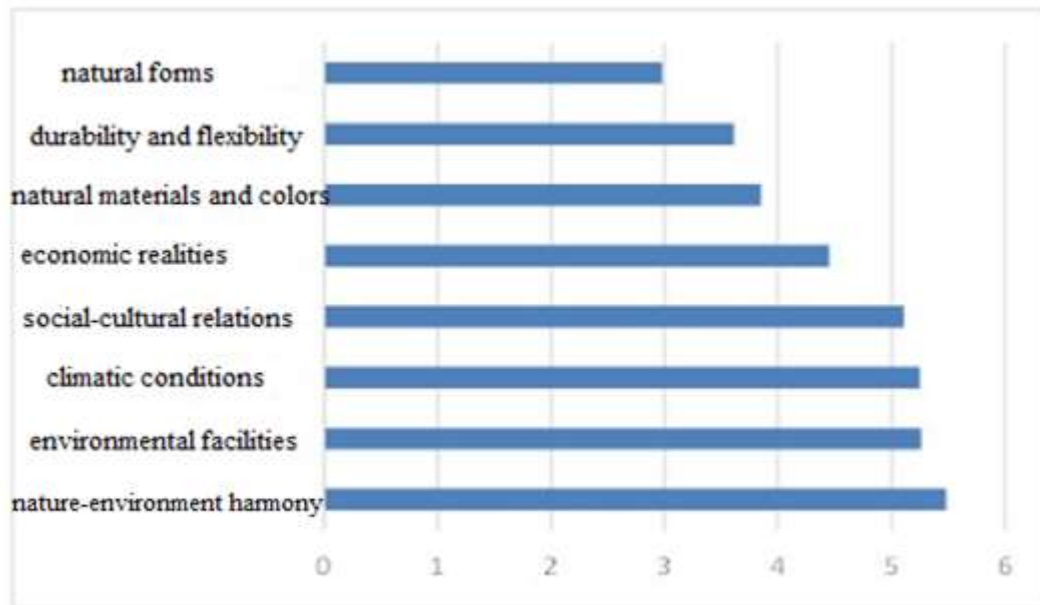
Fig 6 Prioritize the average rank of domestic-biophilic components observed in Enghelab Bazaar

Table 11 Prioritization of the components (Source: Authors)

		Mean rank	X2	df	Sig
Components	Environmental facilities	5.26	151.527	7	0.000
	Natural materials and colors	3.85			
	Climatic conditions	5.25			
	Nature-environment harmony	5.48			
	Durability and flexibility	3.61			
	Natural forms and shapes	2.98			
	Economic realities	4.45			
	Social and cultural relations	5.11			

Table 12 Common biophilic and vernacular architecture components in Shiraz Enghelab Bazaar

Common features of Biophilic & Vernacular design	Architecture Characteristics
Environmental features	Lights, air, water, plant, animals, fire, ...
Natural materials & colors	Local and natural materials, accessible materials, natural colors
Relevant with climatic conditions	Geographic connections, wind, solar radiation, air movement, temperature, rain, ...
Coordinate with natural environment	Topography, integration with nature, low environmental impacts, landscape ecology, suitable for natural context

	Green areas
Durability & Versatility	Durable materials, durable designs, easy and functional designs, age, change, growth, patina of time
Natural forms & patterns	Arches, domes, simulation of natural features, natural motifs
Economic facts of the community	Compatible with society's economy

5. Conclusion

The present study has analyzed the responses to determine models of biophilic design in the commercial complexes that can be implemented from the perspective of users and based on the

components introduced by the experts. The literature introduced 8 components as common components of biophilic and local architecture. The results of the correlation test showed that the 8 components have a direct and significant effect on the promotion of sustainable local identity in the commercial centers. To test the status of using biophilic-local components in the existing successful samples, Shiraz Enghelab Bazaar was investigated.

The results of analysis of the users' opinions showed that:

Environmental facilities have been provided in this space in the best way, and natural resources such as light, shade, and plants have been used properly. These factors are the most available and the most cost-effective factors as tools for the designers.

Natural materials and colors have shown significant correlation based on the results of the correlation test; although they have not been used properly in the studied space.

Climatic condition: based on the type of design, urban localization, and space contextualization of micro spaces, this feature is one of the most underlying factors of biophilic architecture, which has been implemented in Shiraz Enghelab Bazaar properly, and has satisfied the users. Feelings of users about the local identity of a neighborhood are significantly dependent on the conditions of environmental comfort, and especially in combination with context characteristics. Shiraz Enghelab Bazaar has applied this component successfully.

Environment-nature harmony: this factor has possessed the highest level of satisfaction of the users. Adaptability and harmony with the existing fabric, and respecting natural elements in the context have created a sense of the nearness of the manmade environment and natural environment in this space. Users can't imagine the separation of the two spaces. According to analyzed opinions, this factor has significantly affected the localization of the manmade space and creating a significant connection between the two spaces.

Durability and flexibility: durability and flexibility of materials have been almost neglected in the case study. This has been because of a lack of appropriate design.

Natural form: natural forms and shapes such as arch and dome can play a key role not only in local identity but also in strengthening biophilic design. According to the weakness of the designation of this space, this issue has been neglected.

Economic realities: according to the results of the correlation test, based on research objectives, and analysis of field and survey-based collected data, this factor was significantly correlated to the localization of commercial space compared to other factors.

Social-cultural relations: this factor was insignificantly correlated to the research hypothesis, and obtained a high mean value in the studied area. This factor can pave the way for the achievement of biophilic goals as much as possible through strengthening the activity and presence of users in the environment. This is because; the main use of patterns of this type of design is preservation and strengthening of the human relationship with natural elements. Therefore, giving social-cultural soul to the environment and preservation of existing natural structures can affect the achievement of research objectives.

According to the evaluations of this study, it could be found that the measurements taken on common biophilic-local components of Enghelab Bazaar can be revised. It seems that making changes in materials, appropriate colors and materials can help local identification of this space. Regarding the measured local components, the Bazaar can be a good model to design an urban commercial center.

Purposeful designation for the business centers with lots of audiences can affect the culture and identity of a society significantly. Spaces like Enghelab Bazaar can be formed just like the old bazaars and spaces. These spaces can not only be successful in terms of commercial, but they can

be also a good context for other social activities. Also, they can create a good connection between the place and the urban space.

This study recommends further studies on other public spaces (educational or cultural spaces) for local architecture identification. Through this, a suitable model for urban design can be obtained. Also, the mental health of the society can be provided using biophilic architecture in these spaces.

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