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Cultural Components Regeneration in The Development of Physical Factors in The Design of Residential Spaces (Case Study: Damghan City)

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ABSTRACT

Background: The present study aimed to regenerate the cultural components in the physical factors development in line with the design of residential spaces (Case study of Damghan). The present study can be considered as a descriptive correlation and field research.

Methods: The statistical population of this study included two groups of experts and ordinary people. After extracting the indicators and components of physical and cultural factors as a questionnaire to confirm the indicators, the desired questionnaire was given to ten experts and the third round of the Delphi method was performed after collecting the answers of members, and the acceptable agreement was obtained in the third round of Delphi method. To evaluate the validity of the questionnaire, face, and qualitative validity methods were used. After the validity confirmation by experts, the reliability of the questionnaire was confirmed, with Cronbach's alpha value higher than 0.7. Then, a simple random questionnaire was selected and distributed among 384 people in Damghan.

Findings: The results showed that the coefficients of independent variables for cultural characteristics are equal to 0.083, qualitative norms are equal to 0.09 for cultural communications and interactions are equal to 0.40, respectively. The t-statistic value for one independent variables is greater than the standard value (1.96.), and this value according to (sig. = 0.000) at the 95% confidence level is significant, so it can be said that among the dimensions and cultural components effective in the design of residential spaces, only one dimension of communication and cultural interactions are effective, but the effect of cultural characteristics and qualitative norms on the design of residential space is not significant.

Conclusion: The findings of this research showed that physical factors had a positive effect on the design of residential space. But the effect of cultural characteristics and qualitative norms on residential space design was not significant.

Keywords: *Cultural components, Physical factors, Residential space, Damghan*

1. Introduction

Housing is an institution that has been created for a series of complex purposes and is not merely a physical structure. This institution has an inextricably link with culture and so the construction of a house is considered as a cultural phenomenon; its spatial shape and structure are strongly influenced by the culture to which it belongs. Even since the home was considered as a refuge for early humans; the concept of performance is not limited to mere utilitarianism or purely functional space. The shelter aspect of the house was considered an implicit, necessary, and passive duty and the positive aspect of the concept of the house was to create a favorable environment for the family to live as a social unit.

In the ancient architecture of Iran, the architecture of the house was designed and built based on special principles and patterns. These principles were always followed both in the houses of nobles and aristocrats and in the houses of ordinary people. The Iranian house was a direct manifestation of spiritual and cultural values and way of life [1].

According to the recent centuries developments in modern housing, not focusing on residents' culture is considered a problem and not focusing on the cultural behaviors of users in the design, has caused a meaningless relationship between residents and the residential environment is not

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established and thus the spatial belonging and psychological comfort will not be provided.
Therefore, the designed spaces are not responsive to the cultural behaviors of the residents. This is while the past architecture of Iran, as a visual art, has been mostly a manifestation of the culture that governs society, and our traditional buildings have a symbolic value; because symbols allow a culture to make its feelings and thoughts tangible, clear, and receptive [2]. According to the conducted research on the factors affecting the home and residence, culture is placed as the primary and determining factor in the general form and body of housing. Different patterns of houses in areas with similar conditions in terms of economic status, climate, and construction technology resulted in cultural differences in those areas. Since the construction of a house is a cultural phenomenon, the shape of the house (its physical form and spatial organization) is strongly influenced by the cultural environment in which the house belongs [3]. Rapaport also considers the active goal of housing to create an environment that is in harmony with the lifestyle of an ethnic group, and socio-cultural factors play the most important role in the shape of the house [4]. According to the mentioned issues, housing has a wide impact on human life, thinking, and health. But the question is that in the transition from traditional to industrial life, has man been able to provide himself an adequate housing that meets all his needs? Does man's current housing appropriate for his needs for peace, security, aesthetics, comfort, convenience, health, recreation, and privacy? Conceptually, the house architecture that grows in the Iranian tradition and culture differs greatly from the residential architecture in the West. The form presented in traditional residential architecture in Iran always has a deep root and meaning that this culture has had a strong impact on architecture. The impact of culture on architecture and residential design cannot be described in writing. The design of public spaces such as mosques, churches, caravanserais, etc. shows the deep influence of Iranian culture before Islam and after Islam on architecture. Despite the authentic Iranian culture, which is mixed with Islamic culture, the ancient Iranian culture has faded to modern constructions. As the constructions and designs of the residential space consider most of the aspects of modern Western culture, therefore, the re-creation of the cultural matter in the compilation of physical factors in the design of residential spaces is an issue that should be considered. Surveys show that some research has been done in this field. But this research is not complete and extensive. Because, on the one hand, it is important to address the rich Iranian culture and Islamic traditions in the construction and design of residential space, and providing mechanisms and indicators to measure culture in the design of physical space is an inevitable necessity. Therefore, to address these needs, this research is conducted to recreate the cultural issue in writing physical factors in the design of residential spaces in Damghan City. In the present article, by determining the position and importance of culture in shaping the physical form in residential spaces, an attempt has been made to study the regeneration of cultural components in the development of physical factors in the design of residential spaces in Damghan.

2. Research Background

Purdihemi et al, in a study entitled “Physical factors affecting the perception of density in residential environments; Case study: Residential neighborhoods of Mashhad city” state that: In most developed countries, dense development is considered a strategy to achieve social sustainability by stakeholders. In developing countries, however, dense urban areas are largely the result of economic attitudes toward residential environments and have accommodated a larger population in one place. Although density is referred to as a quantitative measure of the density of residential units and the population living in them, in practice it affects the living conditions of residents, including social living conditions, security in common spaces, as well as the way perceive the environment. Therefore, besides quantity, it is very important to focus on the mental effects and other aspects of density. The residents perceive the amount of existing density in the environment not only based on the numerical densities of that environment but also based on mental judgment. This mental perception and judgment depend on the signs and factors which physical factors are considered the most important. Recognizing these signs and prioritizing and designing to reduce their negative effects can increase the negative effects of residential densities. This study to develop design knowledge about the method of arranging residential units, has considered the quantitative qualitative dimension of density through library studies, interviews with experts, setting the questionnaire and survey in three similar areas in terms of socio-economic status of residents, residential density and population density in the city of Mashhad, has investigated the most

important physical factors affecting the perception of density. According to the analysis of data obtained from 110 completed questionnaires, using exploratory factor analysis, eight factors were extracted which the distance and height of buildings, visibility from inside residential units, and aristocracy are considered as the most important of them. The results show that the perception of density in residential environments depends on the configuration of the mass and space, the choice of housing type, and the method of arranging the components and common open spaces in the complexes. Karimzadeh et al. [5] in a study entitled "The Explanation of Cultural Policies Affecting Culture-Based Urban Reconstruction" (With an emphasis on Istanbul's urban recreation experiences in Turkey), state that: In the last twenty years, cultural policies affecting urban planning, the need to regenerate sluggish urban areas and moving towards creative cultural activities has been considered for economic and social developments. This research explains the cultural components affecting culture-centered urban regeneration. This research has been conducted in a qualitative method and the tool for collecting information includes library resources and documents, which has introduced the components such as "cultural uses", "cultural activities in urban public space", "combining cultural activities with creative urban design", "cultural heritage protection" and "cultural tourism" as key criteria and then compared in three urban reconstruction projects in Istanbul, Turkey, and this result is obtained that urban regeneration using creative cultural industries has led to the economic revitalization of the target areas and the convergence of economy and culture has had a great impact on the reconstruction of historical monuments [6]. Asgari Iagh (2016), during a study entitled "The Impact of Architecture and Culture on Residential Buildings," states that: At present, more than ever, we are witnessing unrest in the fields of architecture and the city. We face buildings that have no relationship with the history and culture of Iran land and without the presence of cultural, social, and philosophical backgrounds, according to the tastes and personalities of designers, by indoctrinating foreign examples, has been built on the outskirts of cities and stares the astonished view of urbanites to themselves. Especially in residential architecture, we are witnessing the construction of buildings that are ruled by an economic view of the city and architecture, and in the wake of high and increasing incomes have ignored the cultural, social, and natural features of their construction and regardless to diverse cultural characteristics of different Iranian ethnic groups, in all the vast and diverse areas of Iran, are made with the same and one shape, and due to non-compliance with cultural patterns and lifestyles expel the possibility of desirable life and human growth and excellence in material and spiritual levels from them. It also will provide the possibility of architectural degradation concerning building-making and shelter-making [7].Asadpoor et al, in a study entitled "The Investigation of Aesthetic Concepts in Islamic Culture and Its Crisis in Contemporary Architecture" pointed out the following cases: Beauty is an eternal attraction, where art is a bridge between beauty and humans, and understanding beauty is a divine gift and mental base that leads to objectivity; And art without it is a body without soul and empty from attraction, since that Islamic art results from the spread of Islam and the establishment of a great Islamic civilization and the aesthetics of Islamic art on the one hand is the product of contemplation of Islamic scholars and philosophers in verses and hadiths and it results from a kind of intuitive understanding and practice of artists who lived immersed in the atmosphere of Islamic faith and thought.Therefore, the concept of beauty in Islamic culture is explained corresponds to the concept of existence and the levels of existence and the creator of existence, and the whole Qur'an is a direct and indirect discussion of ontology and human life in the levels of existence, so all of them are topics of goodness and aesthetics. This is while Epistemology is involved in the crisis of its present age, this state has spread to aesthetics and consequently to the compositions of the present age. By reviewing and summarizing the conducted studies and library study, it was concluded that various types of artistic inspired by contemporary art are common among Muslim and well-known artists in Islamic countries that are not compatible with any of the specific structures and principles of Islamic art. Because contemporary aesthetics have emptied the common values of architecture from culture and tradition and have created conditions as if the principles of aesthetics and application in contemporary architecture should be reconsidered and adapted to aesthetics in Islamic culture [8].

Sotoudeh and Karimi, during a study entitled "The investigation of the relationship between indigenous culture and architecture and its impact on improving the quality of design" stated that: In the past, tribal, ethnic, racial, distances,

impenetrable class boundaries, climate, land, and rituals differences impacted the architectural space, and these features led to the emergence of distinct formal differences in life patterns, living spaces and buildings of worship, ritual and even habitation. But the developments of the present century have caused differences between some aspects of life and the culture of society and architecture has no longer can adapt to culture. In this article, using the method of logical reasoning and reviewing the studies conducted among the books, and existing articles, the former professor has investigated the relationship between culture and indigenous architecture and by creating a logical order has explained a definition of the concept of culture based on the sayings of researchers and thinkers in various fields. After that, he defined indigenous architecture and, as a result, used the important features extracted from the concept of culture and, according to the definition of indigenous architecture, he showed the relationship between indigenous culture and architecture. Culture, as a guiding factor, has always led to the emergence of unique methods in architecture, including indigenous architecture [9].

Yaran and Behroo 2017, during a study entitled "The Impact of Islamic Culture and Ethics on Housing and Spatial Body of Houses (Case Study: Qajar Houses in Ardabil City) stated that: With Islam in Iran and the alignment with ideas and thoughts taken from the Qur'an and religious beliefs, it was accompanied by construction techniques in the architecture of Iran, the architecture of this land, with a sacred content. Over time, cultural rupture and identity crisis appeared in the bodies and houses of Iranian cities; so that no longer can find a logical relationship between contemporary architecture and the rich architecture of the past of this land. To solve this crisis, because of the interdisciplinary nature of the research, initially by reasoning method and citation study, the factors affecting culture and also religious effects on the spatial body of houses were identified. Then, by examining and analyzing some examples of Qajar-era houses in Ardabil, the values of Islamic culture and ethics were identified, which ultimately leads to the architectural pattern of house shapes. In the following, the values derived from Islamic culture and ethics affecting housing and the manifestation of these values in the spatial body of the houses studied in this study were investigated which are: Hijab, cooperation, purity, contentment, God-centeredness and obedience, humility [10].

Gholam Alizadeh and Khorram 2013, during a study entitled" The mechanism of culture-home interaction," stated that in our modern housing, not focusing on residents' culture is considered a problem. Lack of attention to the cultural behaviors of users in the design has caused that there is no meaningful relationship between residents and the residential environment and, as a result, the sense of spatial belonging and psychological comfort will not be provided. The designed spaces are not responding to the cultural behaviors of the residents. This is while the past architecture of Iran, as visual art, has been more the manifestation of the culture that governs the society and our traditional buildings have symbolic value; because symbols allow a culture to make its feelings and thoughts tangible, clear, and receptive. To increase the capability of the environment in line with the above requirements, it was necessary to achieve design guidelines for a residential complex, according to the values, beliefs, habits, and patterns of residents, which represented their culture, in the first stage by recognizing home and culture, initially let us examine the reason of the culturality of the house. Then, since offering suggestions to improve the quality of the studied spaces required awareness of the current and yesterday's situation of society, so we investigated the cultural foundations in traditional houses (before the year 1300) and contemporary houses (after the year 1340) except residential spaces. By analyzing and comparing these two cases, the effective parameters in the culturality of the housing phenomenon were extracted. In the next step, by analyzing the information obtained from these parameters, guidelines for culture-oriented design were extracted in a residential complex. Nik Fitrat and Bitaraf, during a study entitled "The investigation of cultural effects on the Indigenous Architecture of Iran from the perspective of sustainability," achieved the following results: The importance and necessity of focusing on culture is one of the advancement ways of human society. When we consider the city, we are considering a place that has the highest level of concentration of power and culture of a community; the place of crystallization as the widest social communication network, where belonging to it brings a kind of identity for the individual. The city, as the crystallization of the religion and thought of society, cannot appear in the same different civilizations. The diversity of cities in the history and geography of the world is more because of this difference than anything else. Indigenous architecture is the basis for emphasizing the

cultural and social values of any society, for the globalization of any society and nation by recognizing the architectural values and culture of that community to achieve the long-term goals of any nation must be started from the indigenous architecture basis of those community, so they continued use of community should be a platform for the globalization of the indigenous architectural style of that community, and in addition, indigenous architecture brings attraction and beauty. The present article introduces the position of sustainability in traditional architecture with a focus on culture and seeks to increase the sustainability of indigenous architectural values and their continued use of them for globalization, so the obtained results show that the preservation and integration of Indigenous architectural values reveal the secret of human connection to history and their physical environment, and consequently causes stability in any language and culture. The present research method is based on the descriptive analysis method and the data collection tool is as library studies [2].

Carter [11] in research that showed that culture plays an important role in physical space and construction, states how archaeologists have dealt with these issues using examples from a diverse set of geographic locations and periods in mainland and island Southeast Asia.

Lazar and Chithra [12] in research, they investigated the role of culture in sustainable development and sustainable built environment. They stated that mutual link between economic, social, and environmental pillars forms the basis of sustainable development. In recent years, culture has been recognized as an essential element in achieving sustainable development.

The study of Clark et al. [13] also shows The places in which people live, sleep, prepare food, and undertake other activities—known variably as homes, residential sites, living sites, and domestic spaces—play a key role in the emergence and evolution of modern human culture

The study of Brunsma et al. [14] also show processes of meaning-making in White spaces as the glue that holds their social structures together. Understanding White spaces and how they operate causes theoretical development from a cultural perspective.

What emerges from the literature is that cities and territories, as palimpsests, continuously transform, with some architectural typologies being replaced by others based on new technologies, political decisions, and building cultures [15]. Architecture has been and is the real means of measuring the culture of a nation, culture has influenced and shaped design, which is the diagram of the ruling value system, and indirectly, it is one of the main foundations of the psychological life of humans [16]. Every building, as a part of the culture, has objectifying a thought through its external form. Of course, it is important to focus on the fact that the role of culture in the formation of all architectural spaces is not the same, but that it is more representative in the organization of cultural, ritual, and public spaces [17]. Architecture has been and is the real means of a nation's culture, when a nation can build beautiful sofas and chandeliers, but builds the worst buildings every day, it indicates the chaotic and dark situation of that society, a situation that The orderliness and lack of organization power of that nation is proven. Every building, as a part of the architectural culture, must objectify this thought through its external form, and in this way, it will be a manifestation. What emerges from the literature is that there is a relationship between culture and architecture and, in fact.

To summarize the theoretical foundations and empirical background of the research, it should be mentioned that culture has always permeated all aspects of human life, from the type of clothing to the way of speaking and architecture. Culture always plays an important role in the architecture and design of residential and non-residential spaces. Investigations showed that in different historical eras, cultural characteristics have always prevailed in construction. The difference in cultural characteristics in different climates has led to the emergence of a style of architecture. For this reason, this research has also investigated and recreated culture in the design of physical spaces and the design of residential spaces.

3. Methods

This research in terms of purpose is applied because the results can be useful in residential space design. Regarding the research method, this research is based on descriptive models because of the use of multiple indicators and also because of the ability to implement the findings of this research in the studied population and case-study this research finally, the approach of this research is quantitative. This study selected all the citizens of Damghan who were over 25 years old and also had a bachelor's degree or higher as the target population. According to the information from the Iranian Statistics Center, the population over 25 years old in this city is about 35 thousand people. But since to answer the questions of this research, at least a bachelor's degree was necessary, therefore, among this population, people who had

a bachelor's degree and higher were selected as the target population, according to the website of the Iranian Statistics Center, the educational information of people over 25 years old in Damghan city. It was checked and the number of these people was estimated at around 7 thousand people. Cochran's formula was used to determine the sample size for this study. The tolerable margin of error is ± 5% and the confidence level is 95%. The sample size is 364 participants who were used in the research. Considering that the level of analysis in this study is as individuals, hence Cochran's formula was used to determine the sample size. This method of sample size determination is one of the most widely used methods. According to this method, about 381 questionnaires should be distributed. According to the study, the acceptable error rate in this research was considered 0.07 and was examined at a 90% confidence level. The sampling method is also a simple random method.

The physical space variable with four dimensions, including visual attractiveness, accessibility, objective factors, and subjective factors, was determined by several indicators with five options, completely disagree, disagree, have no opinion, agree, and strongly agree. The coding of the answers in the mentioned indicators is: strongly agree 5, agree 4, have no opinion 3, disagree 2, and completely disagree 1. The measurement level of this variable is as distance. Also in this research, the variable of culture was divided into two dimensions material and spiritual culture, then for each of the material and spiritual cultural dimensions, the sub-dimensions were considered which are as follows: Cultural characteristics and qualitative norms were considered as dimensions of material culture and also dimensions such as identity-centered and individual values and communication and interactions are also considered as spiritual aspects of culture.

The data collection tool was standard questionnaires from different studies. The indicators provided by Daneshpour and Charkhchian [18], Paslar [19], Jovan Faruzandeh and Metabhi [20], Azimi [21], Karimzadeh and Shahriari [5] were used to measure physical components. Regarding the components of culture, the research of Mohammad Deriniet al. [22], Tankabani, and Shahabian [23] were used. Because the indicators for measuring the variables in this research were adapted from different studies, the Delphi method was used to check the validity of these indicators. After implementing three Delphi rounds, which are presented in the continuation of the research process, and the confirmation of the indicators, the quantitative part of the research was also continued.

In this study, face validity was used. To investigate the face validity in a preliminary test, a questionnaire was distributed among members of the statistical population. To measure face validity, the respondents were asked to answer the questions and express their opinion on the appropriateness of the questionnaire questions to measure the desired index and the existing ambiguities, and their corrective opinions were applied. In this study, with the help of computer and software SPSS 22, Cronbach's alpha score was calculated for structured variables and their results have been described in Table 1.

Table 1: Reliability values by Cronbach's alpha method

Variables	Dimensions of variables	Cronbach's alpha	Reliability
Physical factors	Visual attractivene	0.88	✓ Desirable
	Accessibility	0.91	✓ Desirable
	Objective factors	0.75	✓ Desirable
	Subjective factors	0.82	✓ Desirable
Cultural factors	Material culture	0.72	✓ Desirable
	Cultural capital	0.75	✓ Desirable
	Spiritual culture	0.79	✓ Desirable

4. Results

To determine the physical and cultural components in the design of residential spaces, the theoretical foundations and research literature were used. After extracting the indicators and compiling a questionnaire, this questionnaire was provided to the experts, which the following has presented based on the Delphi steps.

4.1 Delphi Method

In the first round of the Delphi method, based on the factors and indicators obtained from the research literature, a questionnaire which was comprised 40 indicators that each index referred to one factor, was designed as a first-round Delphi questionnaire, it was provided on selected experts of this study which their number were ten people.

Then, the results were presented according to Table 2 description.

Table 2: Results obtained from the first round of Delphi

Index	Expert(10)	Expert((9)	Expert(8)	Expert(7)	Expert(6)	Expert(5)	Expert(4)	Expert(3)	Expert (2)	Expert(1)	The number of responses which were equal to (Too many)	Validity
1	4	4	4	5	4	3	5	4	4	3	8	✓
2	5	4	3	4	5	3	5	5	4	5	8	✓
3	5	5	5	3	5	4	5	5	5	4	9	✓
4	4	4	3	3	5	3	4	3	3	3	4	
5	4	5	4	4	4	3	4	5	4	3	8	✓
6	4	3	5	4	5	3	4	5	4	5	8	✓
7	4	4	5	4	5	4	4	4	3	3	8	✓
8	5	5	4	5	4	4	5	5	5	4	10	✓
9	5	4	4	4	4	3	4	4	4	4	9	✓
10	5	4	4	4	3	4	4	5	4	3	8	✓
11	4	3	4	3	1	3	3	2	4	2	3	
12	4	4	3	4	5	3	5	5	4	4	8	✓
13	4	5	4	5	5	4	4	4	3	3	8	✓
14	4	5	5	4	5	5	3	5	4	5	8	✓
15	4	4	5	3	5	4	3	3	5	4	7	✓
16	4	5	3	4	5	3	4	5	3	4	7	✓
17	3	3	3	2	3	3	3	5	3	4	2	
18	5	5	3	5	4	5	3	5	5	5	8	✓
19	3	3	5	4	1	3	3	2	4	3	3	
20	4	4	5	3	5	5	3	4	4	4	8	✓
21	4	5	4	4	5	3	3	5	5	5	8	✓
22	3	4	5	2	3	3	3	4	4	3	4	
23	4	5	4	4	3	4	4	3	4	4	8	✓
24	4	3	4	5	5	3	4	4	4	3	7	✓
25	4	5	5	5	4	2	4	4	4	4	9	✓
26	4	4	5	4	2	4	4	2	5	4	8	✓
27	4	3	4	4	2	3	4	3	4	3	5	
28	4	3	5	3	1	3	3	1	4	2	3	
29	3	5	5	4	2	4	4	4	4	4	8	✓

30	4	3	4	3	4	4	4	2	4	4	7	✓
31	4	5	4	4	1	3	4	5	3	5	7	✓
32	4	5	4	4	5	3	4	4	3	4	8	✓
33	4	4	4	4	5	3	4	3	5	4	8	✓
34	4	4	5	4	5	5	4	4	3	4	9	✓
35	4	3	5	4	4	4	4	3	4	4	8	✓
36	4	3	5	4	5	3	4	3	5	4	7	✓
37	4	4	4	5	5	3	5	5	4	5	9	✓
38	4	5	3	5	1	3	3	2	4	3	4	✓
39	3	5	4	4	4	5	3	5	3	5	7	✓
40	4	4	5	4	5	4	5	5	4	2	9	✓

(Source: Researcher Findings)

After collecting the questionnaires in the first round and reviewing the results obtained of the experts' score based on the indicators according to Table 2, the components were approved and the obtained agreement were determined, usually if at least 70% of the experts give score to an index or a factor based on significance too many (5) or many (4), it means that there was an agreement factor among experts on it. As it is observed, in the first round, only six indicators were not agreed and the other indicators were approved. In the first round of the Delphi panel, the extraction indices were evaluated and can be seen in Table 2. Many number of indicators have been agreed upon. After collecting the first round questionnaire and analyzing it, the second round Delphi questionnaire was made based on the first round. In the second round of the Delphi method, a questionnaire was prepared which included the ranking obtained from the opinion of panel members in the first round and the factors extracted from the open question in the first questionnaire. This questionnaire was sent to the members again, so that they can confirm or change their answers according to the opinion of other panel members and to express their opinion about the effective factors that were obtained from the open-ended questions of the first round. After collecting the members' answers, the third round of the Delphi method was performed and an acceptable agreement was obtained in the third round of the Delphi method and there was no need to continue the Delphi process. In the second round, this technique was performed to agree on the remaining variables. Table 3 shows the results of the second round.

Table 3: Results of the second round of Delphi

Index	Expert(10)	Expert(9)	Expert(8)	Expert(7)	Expert(6)	Expert(5)	Expert(4)	Expert(3)	Expert(2)	Expert(1)	The number of responses which were equal to 4 (many) or 5 (too many)	Validity
4	4	4	3	4	5	4	4	3	3	3	6	
11	4	5	4	3	5	3	3	5	4	2	6	
17	5	3	4	4	5	5	4	5	4	4	9	✓
19	3	3	5	4	1	5	3	4	4	4	8	✓
22	3	4	5	2	3	3	3	4	4	3	4	
27	4	3	4	4	2	3	4	3	4	3	5	
28	4	3	5	3	1	3	3	1	4	2	3	

(Source: Researcher Findings)

After collecting data in the second round of agreement on research indicators; there have been no significant changes and to ensure the views of the third round of Delphi was conducted which has been implied in the next section. To ensure the change lack of opinions of experts, it has paid to evaluate the opinions, which its output has been shown in Table 4.

Table 4: Results of the third round of Delphi

Index	Expert(10)	Expert(9)	Expert(8)	Expert(7)	Expert(6)	Expert(5)	Expert(4)	Expert(3)	Expert(2)	Expert(1)	The number of responses which were equal to 4 (many) or 5 (too many)	Validity
4	4	4	3	4	5	4	4	3	3	3	6	
11	4	5	4	3	5	3	3	5	4	2	6	
22	3	4	5	2	3	3	3	4	4	3	4	
27	4	3	4	4	2	4	4	3	4	4	7	✓
28	4	4	5	4	4	3	5	5	4	2	8	✓

(Source: Researcher Findings)

According to the results and Table 4, an acceptable agreement has been conducted on the indicators, considering that there is not much difference in the indicators on which little agreement has been made, the continuation of Delphi does not make a difference. Therefore, the continuation of Delphi was stopped, and the approved components are introduced as physical components and cultural components.

After examining the Delphi method and confirmation of extractive indicators and high agreement of members about the indicators, a questionnaire was developed according to the approved indicators and then distributed among the case-study population. To evaluate the reliability of the questionnaire, the first 30 initial questionnaires were distributed and data obtained from these 30 questionnaires were entered SPSS software version 22 with these data, the Cronbach's alpha values were calculated for each of these variables which in Table 5 has given the values of each these variable to determine reliability.

Table 5: Cronbach's alpha values for each variable

Variable name	Variable dimensions	Variables alpha value
Physical components	Visual attractiveness	0.88
	Accessibility	0.82
	Objective factors	0.79
	Subjective factors	0.90
	Cultural characteristics	0.85
Cultural components	Qualitative norms	0.74
	Cultural communication and interactions	0.78
	Design of residential spaces	0.80

As seen in Table 5, Cronbach's alpha value for all three variables and the dimensions of these variables was obtained higher than the critical value of 0.70, so the reliability of the data collection tool is confirmed. The process of distribution and collection of research questionnaires was continued and in total 303 complete questionnaires were collected and entered the research process.

4.2 Investigation of Research Hypotheses

In this section, based on the objectives of the research, the impact of cultural and physical components on the design of residential spaces using linear regression was measured. For this purpose, the following hypothesis is proposed:

H_0: $\alpha=0$

H_1: $\alpha\neq 0$

Physical components do not influence the design of residential spaces.

Physical components influence the design of residential spaces.

The first output of multiple regression is as Table 6, which shows a summary of the model.

Table 6: Summary of regression model

Model	Correlation coefficient	Squared correlation coefficient	Modified determination coefficient	Watson camera statistic
1	0.60	0.37	0.36	1.86

According to Table 6, the correlation coefficient between independent and dependent variables is equal to 0.60 and the determination coefficient rate R^2 is equal to 0.37 which has a good explanatory power. This value shows that 0.37% of the changes in the independent variable are related to the dependent variable but this value does not consider freedom. Therefore, the modified determination coefficient is used for this purpose, which in this model is equal to 0.35. This issue shows that 0.35% of the design of residential spaces is predicted by four factors which are as follows: visual attractiveness, accessibility, objective factors, and subjective factors. Watson camera statistics have been used to examine the correlation between residuals. The value of the Watson camera number is equal to 1.86, and it is a number between 1.5 and 2.5, so there is no correlation between errors in this model, so according to the said indicators, this model provides a good fitness model on the effect of physical components dimension on the design of residential space. The next output obtained from the multiple regression of ANOVA results is as Table 7, which shows the F test and the significance of this statistic shows that the regression model is a good fitness model.

Table 7: ANOVA test results

Model	Squares set	Degree of freedom	Squares mean	F statistic	Significant level
Regression	77. 46	4	19.36	42.93	0.000
Residual	161.60	299	0.451		
Total	211.88	302			

Based on the results of Table 7, the obtained value of F statistic, which is less than 0.05 at the error level is significant, so it shows that the independent variables have acceptable explanatory power and can explain well the number of changes and variance of the dependent variable, so the F statistic or significance level (Sig) is used for the significance of the total regression. The Sig = 0 value shows the rejection of Hypothesis H0 versus Hypothesis H1. Therefore, regression at the level $\alpha = 0.05$ is significant. Finally, the last table is Table 8, which is related to the multiple regression output of the Coefficients table that shows the values of non-standardized and standardized regression impact coefficients. Interpreting these coefficients is based on the Beta coefficient and this statistic shows the standardized regression coefficient of each of the independent variables on the dependent variable of the research.

Table 8: Regression impact coefficients

Variable	**Non-standardized**		**Standardized**	**Value of significance number**	**Significant level SIG**
	B	**Std.Error**	**Beta**	**Number T**	
Fixed value	0.62	0.223		2.77	0.006
Visual attractiveness	0.26	0.059	0.31	4.44	0.000
Accessibility	0.12	0.065	0.102	2.80	0.026
Objective factors	0.29	0.079	0.276	3.64	0.000
Subjective factors	0.001	0.040	0.001	0.013	0.990

The results of Table 8 show the Beta value of the model fixed number is equal to 0.62 and the coefficients of the independent variables for visual attractiveness are equal to 0.26, accessibility is equal to 0.12, objective factors are equal to 0.29 and subjective factors are equal to 0.001. Also according to Table 8, the t-statistic value for three independent variables is greater than the standard value (1.96), and these values according to (sig. = 0.000) at the 95% confidence level significant, so it can be said that among the dimensions and physical components effective in the design of residential spaces, three dimensions of visual attractiveness, accessibility, and objective factors are effective, but the effect of subjective factors on the design of residential space is not significant.

- Cultural components do not influence the design of residential spaces.

- Cultural components influence the design of residential spaces.

$$\begin{cases} H_0: \alpha=0 \\ H_1: \alpha\neq 0 \end{cases}$$

The first output of multiple regression is as Table 9, which shows a summary of the model.

Table 9: Summary of the regression model

Model	**Correlation coefficient**	**Squared correlation coefficient**	**Modified determination coefficient**	**Watson camera statistic**
1	0.49	0.24	0.23	2.02

According to Table 9, the correlation coefficient between independent and dependent variables is equal to 0.49 and the determination coefficient rate R^2 is equal to 0.24 which has a moderate explanatory power. This value shows that 0.24% of the changes in the independent variable are related to the dependent variable but this value does not consider freedom. Therefore, the

modified determination coefficient is used for this purpose, which in this model is equal to 0.23. This issue shows that 0.23% of the design of residential spaces is predicted by three factors which are as follows: Cultural characteristics, qualitative norms, and cultural communication and interactions. Watson camera statistic has been used to examine the correlation between residuals. The value of Watson camera number is equal to 2.02, and it is a number between 1.5 and 2.5, so there is no correlation between errors in this model, so according to the said indicators, this model provides a good fitness model on the effect of cultural components dimension on the design of residential space.

The next output obtained from the multiple regression of ANOVA results is as Table 10, which shows the F test and the significance of this statistic shows the regression model fitness.

Table 10: ANOVA test results

Model	Squares set	Degree of freedom	Squares mean	F statistic	Significant level
Regression	50. 28	3	16.76	31.01	0.000
Residual	161.60	299	0.540		
Total	211.88	302			

Based on the results of Table 10, the obtained value of F statistic, which is significantly less than 0.05 at the error level, so it shows that the independent variables have acceptable explanatory power and can explain well the number of changes and variance of the dependent variable, so the F statistic or significance level (Sig) is used for the significance of the total regression. The Sig = 0 value shows the rejection of Hypothesis H0 versus Hypothesis H1. Therefore, regression at the level $\alpha = 0.05$ is significant. Finally, the last table is Table 11, which is related to the multiple regression output of the Coefficients table that shows the values of non-standardized and standardized regression impact coefficients. Interpreting these coefficients is based on the Beta coefficient and this statistic shows the standardized regression coefficient of each of the independent variables on the dependent variable of the research.

Table 11: Regression impact coefficients

Variable	Non-standardized		Standardized	Value of significant number	Significant level SIG
	B	Std. Error	Beta	Number T	
Fixed value	0.62	0.191		7.49	0.000
Cultural characteristics	0.083	0.056	0.085	1.49	0.137
Qualitative norms	0.09	0.055	0.096	1.59	0.113
Cultural communication and interactions	0.39	0.056	0.40	7.02	0.000

The results of Table 11 show that the coefficients of independent variables for cultural characteristics are equal to 0.083, qualitative norms are equal to 0.09 for cultural communications and interactions are equal to 0.40, respectively. Also according to Table 11, the t-statistic value for one independent variables is greater than the standard value (1.96.), and this value according to (sig. = 0.000) at the 95% confidence level is significant, so it can be said that among the dimensions and cultural components effective in the design of residential spaces, only one dimension of communication and cultural interactions are effective, but the effect of cultural characteristics and qualitative norms on the design of residential space is not significant.

The research data in this chapter are analyzed in two main parts. The first part is related to the data obtained from the Delphi technique, based on the research literature, indicators related to the dimensions of physical components and cultural components were identified, then these indicators were given to the experts of the Delphi group. 10 people were selected as experts. They were selected for three Delphi rounds and an acceptable agreement was reached in the third Delphi round and there was no need to continue the Delphi process. After the indicators were confirmed by the experts, this questionnaire was validated. After confirming the validity and reliability of the questionnaires, the process of data distribution and collection was done. The analysis of the collected information was done in two parts. In the inferential part, the normality of the research data was confirmed. By using multiple linear regression, the hypotheses were examined. The results showed the effect of several dimensions of the variables of physical components and cultural components in the design of residential space.

5. Discussion and Conclusion

Therefore, it can be said that among the effective physical dimensions and components

in the design of residential spaces, the three dimensions of visual attractiveness, accessibility, and objective factors are effective, but the effect of subjective factors on the design of residential space is not significant. Regarding the results of linear regression tests, the hypothesis; “Cultural components influence the design of residential spaces” were examined and tested. The results show that the coefficients of independent variables for cultural characteristics are equal to 0.083, qualitative norms equal to 0.09, and cultural communication and interactions equal to 0.40. The t-statistic value for one independent variables is greater than the standard value (1.96.), and this value according to (sig. = 0.000) at the 95% confidence level is significant, so it can be said that among the dimensions and cultural components effective in the design of residential spaces, only one dimension of communication and cultural interactions are effective, but the effect of cultural characteristics and qualitative norms on the design of residential space is not significant. This study showed that cultural components have a positive effect on the design of residential spaces. Architecture as a social phenomenon originates from culture and affects it and is a mirror of human thoughts concerning space, aesthetics, and culture. For this reason, the architectural style of each period is considered a reflection of its culture and art and is commensurate with the changes that occur in other areas of life and art.The findings of this study on the impact of cultural components are consistent with many previous studies. For example, Parvardinejad et al. in a study stated that among the various factors influencing the design of traditional Iranian houses, climate, and culture have both played a very important role [24]. Yarikia et al. [25] in a study investigated the relationship between brain structures and users' emotional perceptions in dealing with physical elements. Because the physical environment can respond to the psychological needs of space users by influencing the behaviors of people inside the spaces; therefore, improving the quality level, and increasing the efficiency of architectural spaces by focusing on the principles based on neuroscience can be important issues. This research showed that cultural components have a positive effect on the design of residential spaces. Architecture as a social phenomenon originates from culture and influences it and is a mirror of human thoughts concerning space, aesthetics, and culture. For this reason, the architectural style of each period is considered a reflection of its culture and art and is proportional to the transformations that occur in other areas of life and art [26]. The findings of this research regarding the influence of cultural components are in line with many previous types of research, for example, Parvardinejad et al. have been doing In a research, Emami et al. [27] stated that characteristics such as privacy, gender roles, the structure of relationships in the family and social relations, and the way of living are among the cultural characteristics that play a role in the body's formation of

settlements in the Kermanj and Turkmen tribes. have had a lot Ali Rezaei et al. [28] stated that every society has its own culture, which establishes the foundation of the architecture of that society, and the architecture of that society is the objective image of that culture. Architecture, as changeable visual signs, creates the language of a culture, which shows the spiritual content of a culture and gives it stability. Drees and Khaiti [29] stated that the culture or lifestyle of a person with his housing and his place of residence have always been affected by each other and with a more accurate attitude, culture (lifestyle) and housing can be introduced in a bilateral and synergistic relationship. Ogut et al. [30] stated that there is a relationship between culture and architecture. Al-Thahab [31] investigated the direct and indirect effects of culture and society's values in architecture and showed how culture and cultural changes affect the general form and function of architectural systems.

The findings of this research showed that physical factors have a positive effect on the design of residential space. Today, only focusing on the quantitative aspect of space design and looking at it one-dimensionally has caused the quality of most public and open spaces to decrease. So some of these spaces suffer from the lack of necessary vitality and dynamism [32]. In research, Yari Kia et al. [33] examine the relationship between brain structures and emotional perceptions of users when dealing with physical elements. Because the physical environment can respond to the psychological needs of the space users by influencing the behavior of people inside the spaces; therefore, it becomes important to improve the quality level and increase the efficiency of architectural spaces by focusing on principles based on neuroscience. The research results of Mazloum and Hedayati Marzbali [34] show that livability had the greatest impact on the quality of the residential environment (0.405) and the least impact on vitality (0.116). Also, the variables of outdoor environmental quality (0.232) and satisfaction (0.227). They rank second and third in terms of impact on livability. The research of Rasulzadeh and Seyed Almasi [35] is an attempt to increase the sense of belonging to the place in these people by using the physical factors of the environment in the design of residential complexes for the disabled. Therefore, with the benefit of the qualitative method, the subject is researched and solutions are presented toward the desire to increase the perception of the sense of belonging to the place. Shahbazi et al. Environmental vitality in the open spaces of the residential complex from the perspective of designers and residents. The results show that by analyzing the interviews conducted with experts, 12 main components of environmental vitality in the spatial-physical dimension affect the open spaces of the studied residential complex. This is while According to residents, the component of “relationship and memory-making of a place” is the most effective component affecting the environmental vitality of open

spaces of residential complexes. This component is among the components that were neglected by the experts and finally, by analyzing the responses of the residents, other influential components were also extracted. Also, by analyzing the opinions of the residents, the residential complexes that had a scattered pattern, in two components of the cohesion of positions and spatial diversity, the residential complexes that had a concentrated pattern, in the two components of spatial continuity and openness, and the residential complexes that had a strip pattern, in four components. Form, order, and diversity, a sense of individuality and restraint, and the creation of public and private arenas were shared. According to what was said, the findings of this research are consistent with the findings of previous research.

5.1 Research limitations

Undoubtedly, every research has limitations. These constraints can be controlled or beyond the researcher's control. However, this study had several controllable and uncontrollable limitations, which are presented below:

Undoubtedly, the main limitation of any research project is the inability to generalize the research results to other statistical communities. The present study is not an exception to this rule and its results cannot be generalized except for the location and statistical population of this study.

Limitations in implementing questionnaires in terms of reluctance to answer by some members of the sample, inaccuracy in answering questions, and biases that some members of the sample may have in answering some questions are other limitations of the current research.

5.2 Practical suggestions

According to the findings and experimental results of this research, it is suggested

In construction, it is necessary to consider the light and lighting, the condition of the roads, the width of the roads, the appearance of the alleys, streets and squares, parks and green spaces, the condition of the facade of the buildings and the setback of the buildings. The geometry. Discipline. Pay attention to coordination and harmony.

It is suggested to focus on access in construction. This issue of access should be that is easy to other parts of the city and to public transportation. Also, access to educational centers and shopping centers, health services, sports facilities, etc. should be made possible to some extent.

In the construction of residential units, attention should be paid to objective and subjective factors. The aim and subjective characteristics of the residential environment are the main determinants of people's satisfaction. The spatial development of a landscape without proper evaluation of cognitive aesthetic effects causes a waste of resources. Therefore, it seems necessary to know all kinds of aim and subjective factors for correct evaluation in architecture and design of residential space.

This research showed that communication and cultural interactions are effective in the design of residential space, therefore it is suggested:

The field of participation and dialogue should be provided by preserving the identity and values of individuals and all.

Individual and collective rights should be provided and the psychological security of individuals and collective should be created.

Residents' opinions and participation should carry out matters related to the construction and design of residential spaces. This can be done by creating open spaces and green spaces in cities for more social interaction among residents.

Creating a sense of trust among the people of the city by involving them in the programs and changes that are made in the design of residential and non-residential spaces.

5.3 Suggestions for future research

As mentioned, a questionnaire was used to collect data, and the questionnaire tool was also stated as a limitation in the previous section, so for better and more reliable conclusions, besides the questionnaire, the use of other tools such as interviews, questions open and qualitative research is also recommended.

The model of this research be tested in other statistical communities so that its results can be more trusted.

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