Comparative Study on Security Components in Dezful Housing Based on the Kerry Walk Method

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ABSTRACT

The contemporary living crisis that is rooted in disconnection from historical period and context culture has led to a housing crisis, the sign of which can be seen in the changed quality of life of residents living on newly-built fabrics. This qualitative level results in some differences between these two fabrics, which may reduce the mental and social security of contemporary residents. In this research, the null hypothesis assumes that the study of historical fabric and comparing it with the contemporary era are proper contexts used to create security in residential structures. Hence, this study aims to recognize the values available in traditional housing using effective components to provide some strategies to cope with this crisis. The present paper investigated the security rate of individuals comparatively and then identified the factors affecting housing quality. Comparison between houses located in Dezful was done based on the Kerry Walk method, and security was examined using field observations, a survey in the fabric, and library studies. Moreover, the research test included measurement of household weight based on the Entropy-Shannon method and data assessment based on the Vicor Analytical Model in two considered fabrics. Finally, the deductive logic method was used to reach a conclusion and propose some strategies to improve the quality of architecture. Studies indicated that the security rate (71.4%) in traditional housing satisfies the need of residents more than its value (28.6%) in the contemporary era. Although some security-creating variables exist in contemporary housing, security-providing indicators in this housing include visual and environmental comfort, spaces' legibility, economy and income level of households, monitoring and surveillance, privacy, space's dimension, and space perception.

Keywords: Traditional Housing, Contemporary Housing, Security, Dezful, Kerry Walk.

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1. INTRODUCTION

The concept of settlement has been defined as a place for living and providing security over human life history (Rahmania et al. 2015, 234). Space and place design is effective in understanding human expectations and needs, and creating a field to meet these needs. On the other hand, the development of human communities and lifestyle change affects the urban and architectural space design resulting in the importance of this subject that "environment not only consists of physical elements but also includes messages, meanings, and codes that people encrypt them based on the roles, expectations, motivations, and other factors" (Pakzad and Bozorg 2012, 153; Felahat 2006, 58; Rapaport 1990). The developments that occurred in recent years have prevented new urban facilities and living conditions of people to provide peace and security in residential environments (Kian and Mirkatouli 2010, 19). Moreover, the rapid growth of cities can be expressed from other aspects causing some distortions due to fast construction, immigrant acceptance, and cultural differences. This subject has played an important role in creating security (Mehrafzon et al. 2020) decreasing the quality of life. Therefore, it was necessary to study this topic since the contemporary urban fabric does not include livability components and individual place attachment. On the other hand, effective measures for quality of life and security have been reduced (Zarghami and Sadat 2016, 70; Häuplik 2011, 6) that can achieve this goal using design strategies (Seyyedein et al. 2019, 112). On the other hand, a lack of attention to security components in the architectural body has led to improper housing and disorder among people (Roshanfekr Jurshari et al. 2021, 669-670). This issue has led to dissatisfaction, and its persistence may result in some harm. Hence, the present study aims to create a quality of security in the new urban body. Moreover, it is assumed that one can create some components for security revision in contemporary housing design based on the historical fabric experience. Moreover, this topic has ignored some security components in the contemporary residential body due to conditions and the rapid construction of the new fabric. Hence, the quality of life can be improved by recognizing and applying effective strategies in this field. Moreover, the historical fabric is less noticeable as a visible document of the residential body, and a review of the buildings constructed in that era can help to find the changed perception of people about the place. Therefore, the purpose of this study is to find values available in traditional housing based on the components affecting the cultural structure, provide some strategies to overcome security crises, and answer the considered questions: what are effective components in creating security in Dezful housing? What strategies can be suggested for the construction of contemporary buildings based on the components affecting security? Hence, the extant study considers the urban fabric scope but also focuses on the housing elements to control research variables.

2. SECURITY BACKGROUND IN ARCHITECTURE

Ghazizadeh (2016) conducted a study entitled "Review of Iranian residential architecture identity, in the Transition of Time and Place" explaining that two security and peace indicators play a vital role in forming a specific identity o housing in historical fabric. Zarghami et al. (2016) carried out a comparative study on Persian-Islamic indicators with apartment housing expressing that security is the most important index for residents to meet their living needs. Pakzad carried out a study entitled "planning urban secure spaces with CRTED Approach" explaining that a secure space can be provided successfully using this model. Findings indicate that the security index is significantly related to physical components, space performance, and perceptual variables in historical neighborhoods. Izadi et al. (2015) carried out a study entitled "Improvement of Sense of Security in public spaces through urban design" concluding that creating security in urban spaces makes that space a place where residents are satisfied. This goal can be achieved based on the physical indicators, performance, and provided physical needs and perceptual-mental dimensions. Shahcheragi et al. (2016) write a book title "Environed in the Environment" which, considers security dimensions in studying some effective indicators, such as space form and size, environmental comfort, space performance, and creating peace resulting from it, sense of belonging to space, and economy. Jalalian et al. (2016) carried out a study entitled "conceptual modeling of environmental factors influencing the security residential complexes" explaining that factors affecting security include some criteria, such as community, body, and economy. The reviewed studies indicate that security is one of the criteria influencing the quality of residence, which is used as a precious concept in traditional housing. Moreover, studies show that security is a criterion influencing the quality of settlement, which is used as a valuable concept in traditional housing. Moreover, studying historical and contemporary housing and comparing them create optimal, effective, significant, and secure architecture. Hence, security can be measured by using indicators suitable for the geographical area and designing a new model for this measurement. Therefore, this study has tried to explain the factors influencing security using a purposeful technique. This study then compares the contemporary and traditional periods considering the developments and determining security samples based on the effective components.

2.1. Theoretical Foundations of Security in Architecture

In the human needs model, Jon Lang has classified hierarchies and relations between needs in different categories naming security as one of the underlying needs. According to theories, moreover, security is highly important in comprises two objective (physical components) and subjective (social components) dimensions (Shawket 2019). This topic has been divided into its specific components, which can be classified as objective-subjective image, social communications and facilities, and public services. On the other hand, public perception of security and its achievement rate in urban environments and architectural bodies are the main concerns of urban practitioners and architects. Hence, security assessment depends on the approach used by a researcher to create a proper security level. Moreover, security creates an environment, which alleviates the fear of crime and criminality and improves the quality of life by consideration of its concepts in the design purposefully and suitably (Motalebi and Kkhodadadi 2016, 68). Elizabeth Wood explains that welfare facilities are highly effective in creating security. Jane Jacobs believes that urban spaces must be dynamic and contribute to social activities created by diverse uses and their mixtures (Jacobs 1961). Ray Jeffrey explains that crime and insecurity can be prevented through the accurate design of residential spaces and their surrounding environment. Moreover, one can prevent insecurity by creating proper moral conditions for individuals (Rahmat 2012). Oscar Newman believes that residential space must be defendable to create a secure environment. He also introduces adaptability, neighborhood, supervision, and control as components of a defendable space (Crowe 2000). Grover Cleveland explains that size, space scale, house density, and the number of occupants affect the residents' responsibility for the environment and create security (Jalalian et al. 2016). According to the examined components, it can be explained that security aspects include general dimensions of physical conditions, performance rate, economy, perception, and mind of individuals.

3. RESEARCH AREA

The neighborhoods of contemporary and historical fabrics of Dezful City were valued and selected based on the weighing method conducted in the research method. The historic monuments are located in Ghalee, Masjed, Miandareh, Shah Rukn Al-Din, Pouladian, Moghadasian, and other neighborhoods. Moreover, the house included all works recorded in the Cultural Heritage Organization shining as a gem found in ancient architecture with a measurable body in the traditional fabric. On the other hand, the considered houses in the contemporary fabric have been selected from newly-built neighborhoods that have larger areas compared to other textures.

4. METHODOLOGY AND SCIENTIFIC RESEARCH PROCESS

A scientific subject is examined and adapted based on comparison and assessment, which produces some concepts such as difference and similarity. The researcher reviews and criticizes the comparative issues in different contexts and then concludes (Piravivanak 2016). Kerry Walk Method is a scientific model used to compare a concept during two different periods. This method includes the following steps: reference framework, comparison context or foundation, hypothesis or thesis, structural order, and connection between two comparative topics as shown in Figure 1.
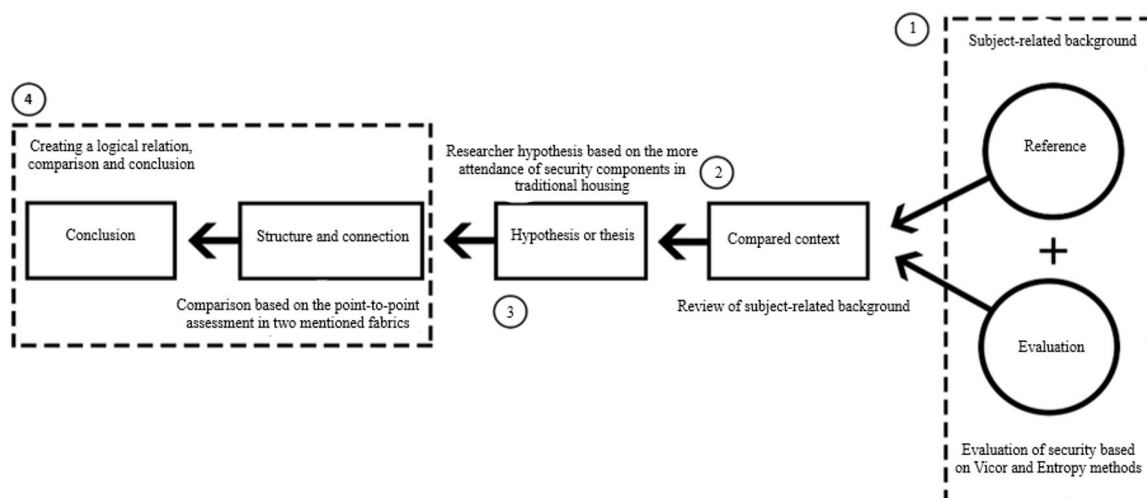

Fig. 1. Theoretical Framework

The first stage of the Kerry Walk Method addresses the reference framework and determined the comparative concepts based on the theoretical framework and background. This is the first step that is taken in infrastructure. In this step, background and theoretical foundations are reviewed and a reference framework is determined. The data collected from the reference framework were used to shape the model for measures influencing the security of the architecture body and security comparison in the housing.

The theorists and researchers who have conducted studies in this field are Elizabeth Wood, Jane Jacobs, Ray Jeffrey, Oscar Newman, George Kling, Wilson, Granland, Felahat, Montgomery, David Kanter, etc. (Allei et al. 2021, 8-9; Ebrahim Besabi and Kamran Kasmaei 2020, 185-186; Shahcheraghi and Bandarabadi 2017, 66; Roshanafkar Jourshari et al. 2020). Some research components have been created by comparing the reviewed components in Dezful Housing. Another part of the components has been collected from field observations and factors influencing structures creating residential bodies. Finally, components are collected and classified to shape the initial model, which is used as the final mode after being evaluated for a comparative study.

Table 1. Dimensions of Security Assessment in a Residential Space

General Dimensions of Security			
Architectural Body	Space Performance	Economy of Residence	Mental and Social Perception of Individuals

(based on Jalalian et al. 2016; Allei et al. 2021; Ebrahim Besabi and Kamran Kasmaei 2020)

Vicor method was used in this step to measure physical components; researchers also evaluated security components based on this method. The Vicor method is used to solve multi-criteria decision-making problems; this method aims to select the best option based on the solution nearest to the ideal solution (Amiri 2007, 171).

A. Introducing components influencing security in housing: identify and detect spaces; routing and space legibility; effect of housing dimensions on security; the influence of space size on security and peace; space multiplicity when required and creating security sense; effect of space dimensions on the individual during loneliness; effect of natural light on security of mind; noise and visual pollution; the influence of residential façade on the security rate; privacy area in private space; privacy area in all residential spaces; security of mind in the privacy of public spaces; security of mind about surveillance and monitoring in the space; effect of light on the space control and control; effect of the economy on the residents' security of mind; safety equipment and creating security of mind for occupants; the influence of space on place attachment among individuals; positive experiences and its effect on the sense of security.

B. Forming matrix based on the data: in this phase, the initial data have been determined as an integer based on the numerical value of the Likert Scale. Moreover, a 2D matrix is formed using these numbers to de descaled in the next step and do the evaluation process.

C. Descaling matrix: to make different data comparable (in terms of measurement unit), the descaling process must be done. This method makes the numerical values dimensionless and summable. The descaling method is done by using linear formula in which, the corresponding element in the initial matrix is measured by summing up the elements of the corresponding elements.
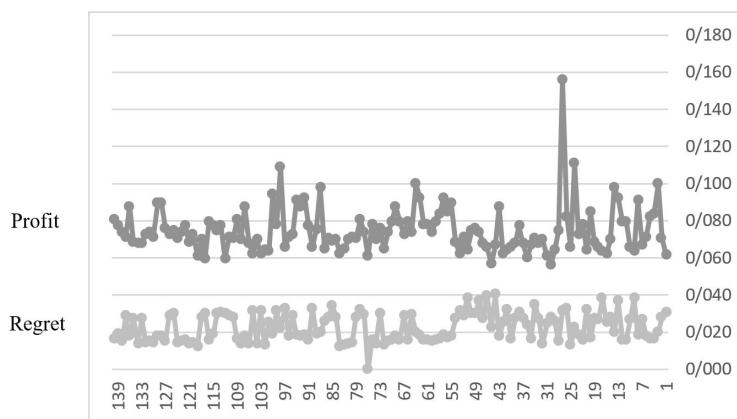

Fig. 2. Profit and Regret Rate in Households

D. Profit and Regret Rate: the best (profit) and worse (regret) numerical value is measured in the sample society. The maximum and minimum rates are then determined as (f+ max) and (f- min), respectively. The diagram shown in Figure 2 indicates that Housing 30 and Housing 27 are considered the negative and positive samples, respectively based on the profit (best) value. Moreover, housing 76 and housing 44 are considered the positive and negative samples, respectively based on the regret (worse) value.

E. Measuring weight using the Entropy-Shannon method: samples have been weighed using the Entropy method in this phase. This method consists of three stages normalizing the frequency matrix, calculating the information load of the category, and measuring the categories with higher information lead using the load and impact factor of these categories. Moreover, Figure 3 depicts that samples 44 and 1 have the maximum and minimum weights, respectively.
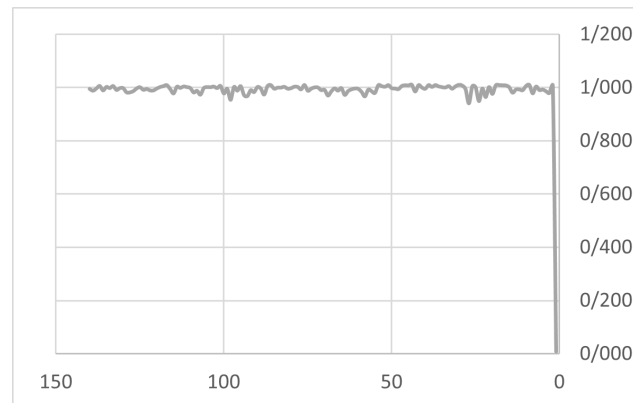
Fig. 3. Profit and Regret Rate in Households

F. Measuring profitability (S) and regret (R) in security criteria: profitability (S) indicates the relative distance between the considered solution and the positive ideal solution, while regret (R) shows the maximum dissatisfaction with the considered solution compared to the positive ideal solution.

G. Determining Q values in each criterion: Qi is the Vicor index expressing the value of solution i, and is measured for each criterion using the relevant equation.
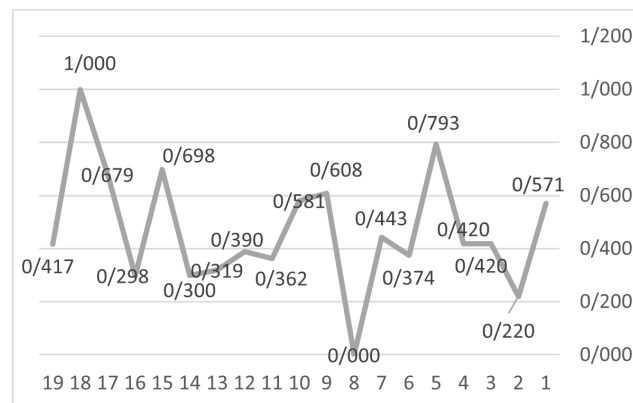

Fig. 4. Q Values in Vicor Analysis Based on the Criteria

According to Figure 4, criteria 8 and 18 had the minimum and maximum Q values, respectively. It should be mentioned that the most suitable rank is assigned to the criterion with the lowest Q value.

H. Valuating criteria based on Q: Components are ranked and valued based on the calculated Q and their values have been mentioned in ascending trend based on their numerical values in Figure 5. The lowest Q value takes the first rank (the most suitable degree), while the highest Q value takes the last rank (the most improper degree).
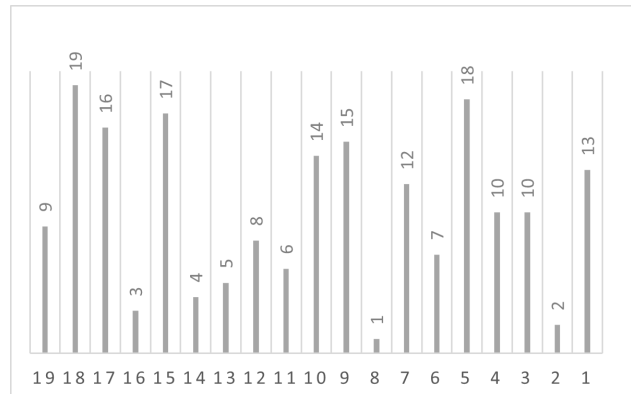
Fig. 5. Ranking Criteria in Vicor Analysis

Proper and improper criteria can be found by evaluating ad ranking them through the Vicor method, so the cells are examined based on the influential criteria. Moreover, the model of measures influencing the security rate of spaces is designed by evaluating the components measuring security in housing. Table 2 reports these criteria. Improper components have been removed from this model, and components affecting the historical and contemporary houses have been used.

Table 2. Measures Affecting Security in Contemporary and Traditional Housing in Dezful

Macro	Micro	New Criterion	Macro	Micro	New Criterion
	Space Form	Simple identification	Performance	Permeability (Privacy)	Privacy area in private spaces
		Rapid routing			Privacy area in all residential spaces
	Size	Effect of housing size on security rate			Peace of mind for privacy in the space
		Effect of space size on Individuals'security of mind		Surveillance and Control	Peace of mind in surveillance of spaces
Physical		Effect of space size on the individual during Loneliness	Economy	Household's Income	Effect of Economy on residents' security of Mind
	Comfort	Effect of natural light on security rate	Mental perception	Safety	Safety equipment and creating security for individuals
		Effect of artificial light on the Security of Mind		Experience	Positive experience
		Noise and visual pollution			
		Effect of Residential façade on Security			

(Adopted from Ebrahim Besabi and Kamran Kasmaei 2020; Shahcheraghi and Bandarabadi 2017; Roshanafkar Jourshari et al. 2020)

The second step comprises a comparison foundation and context in which reasons and bases considered by researchers are important to select comparative options. This study compares the contemporary and historical fabrics influenced by different qualitative levels in individuals' lives. Quality of life is different even in cities with precious history. Hence, residents' satisfaction and surveying them are important cases. Therefore, a questionnaire was designed for security components and distributed among residents to assess the qualitative and satisfaction levels of houses located in the two mentioned fabrics. The target population comprised 70 households living in the historical fabric and 70 households living in the contemporary fabric that was selected using Cochrane sampling. The internal validity of the questionnaire was measured based on the Cronbach's alpha then its reliability was determined. Moreover, Cronbach's alpha was calculated through Minitab software, and results were reported in Table 3.

Table 3. Calculation of Cronbach's Alpha

Contemporary Housing		Traditional Housing	
Quantity	Alpha	Quantity	Alpha
70	0.8174	70	0.8031

Hypothesis or thesis is the third phase of the Kerry Walk method. This phase examines how comparative subjects are connected and linked. Researchers assume that factors influencing security are more used in historical housing compared to contemporary housing. Hence, the components affecting historical fabric are identified. and the two periods are compared.

The fourth phase of the Kerry Walk method includes a structural hierarchy in which the main body of the paper is shaped. Structural hierarchy is done within two techniques: text-to-text or point-to-point. The extant study used a point-to-point method based on the security-creating factors. These factors are sometimes in opposition to each other in contemporary and historical housing. Hence, security has been examined using the point-to-point method in the findings section.

The connection between two comparable subjects is the final phase of the Kerry Walk method in which, researchers explain and interpret the case by creating a logical relationship between comparable statements. The results obtained from a comparative study on security in Desful Housing indicate that this phase was conducted in this study explaining and interpreting the case based on the research findings and logical reasoning method.

5. DATA ANALYSIS

The components adjusted based on the model include identifying and routing spaces, the effect of spatial dimension and size on individual security of mind in different collective and personal conditions, the effect of natural and artificial light on the environment, noise and visual pollutions, privacy and public realm of housing, individual security of mind for surveillance and control created in the housing, effect of economy and income of household on individual security of mind. The mentioned factors are valuable criteria used to measure the security rate in residential buildings of Dezful, which can be generalized to other cities., Moreover, Table 5 reports the respondents' agreement on each criterion based on the period and final result.
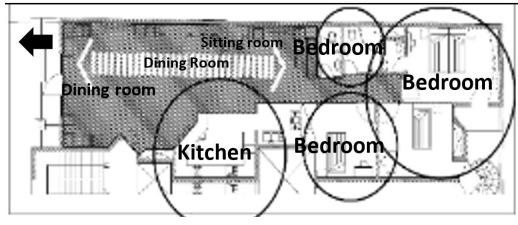
Table 4. Result of the Questionnaire Distributed among Residents Living in Contemporary and Traditional Housings of Desful based on Research Variables

Row	Criterion	Time	Agreement	Row	Criterion	Time	Agreement
1	Legibility and Routing Spaces	Contemporary	90%	5	Surveillance and Control	Contemporary	52.8%
		Traditional	86.5%			Traditional	11.4%
2	Space Dimension and Size	Contemporary	66.45%	6	Income Level and Economy of Households	Contemporary	41.4%
		Traditional	89.3%			Traditional	61.5%
3	Visual Comfort	Contemporary	41.4%	7	Experiences in the Space and Their Effect on the Security	Contemporary	48.6%
		Traditional	84.3%			Traditional	71.4%
4	Privacy in Spaces	Contemporary	57.1%				
			79.5%				

The agreement percent was determined based on the positive response of households to the criterion, which was reported for each period in the table above.
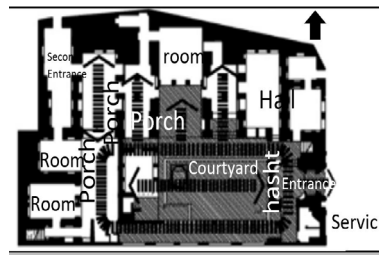
Moreover, the examined criteria have been formed based on the aggregated micro-criteria, which can be measured within 7 categories of criteria.

Table 5. Models Creating Security and Security of Mind in Traditional and Contemporary Periods' Housing

1.Legibility and Routing Space

Housing Period: Contemporary

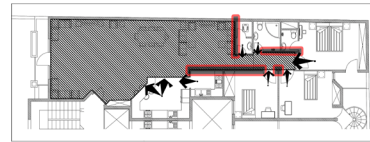| Explanation of model: simple access to different spaces that have been created with different space layouts compared to traditional architecture, and are shaped around a linear axis. Moreover, this leads to higher legibility in contemporary housing.	

Housing Period: Traditional	
Explanation of model: different accesses to destination spaces (rooms, hall, etc.) that occurs with access hierarchy leading to lower legibility.	
Housing Period: Contemporary	
Explanation of model: decline in wall numbers and widened view of the viewer in some parts have led to the legibility of space in contemporary housing.	
Housing Period: Traditional	
Explanation of model: more walls and division of spaces have reduced legibility in traditional housing, so viewers must attend in different locations of housing to understand the spaces.	

Housing Period: Traditional
Explanation of model: regarding the suitable division of housing spaces and lack of direct view of the viewer over different realms, the privacy rate has been increased in this kind of housing.

Housing Period: Contemporary	
Explanation of model: according to the place of the viewer in contemporary housing, rapid and simple access to space occurs.	
Housing Period: Traditional	
Explanation of model: multiple placement locations of reviewers in different parts of the housing and required attendance in the location for space detection have decreased legibility in traditional housing.	
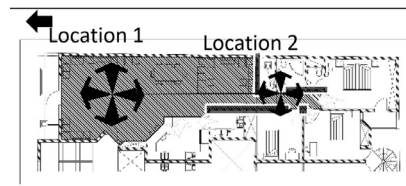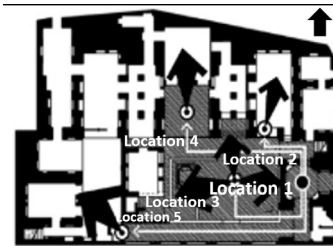
2. Space Dimension and Size	
Housing Period: Contemporary	
Explanation of model: reduction in spatial types and allocating them to a special unction have limited spaces determining their size for groups with certain functions.	
Housing Period: Traditional	
Explanation of model: space multiplicity and multi-functionality in traditional housing meet users' needs in crowded and private times, and security of mind exists for space requirements.	
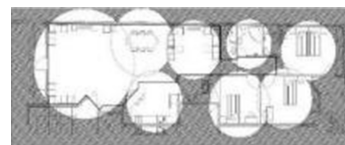
3. Visual and Environmental Comfort

Housing Period: Contemporary

Explanation of model: different geometric patterns, materials, irrelevant colors, different layouts of spaces, improper skyline, etc. in contemporary housing have led to chaos in the urban landscape,
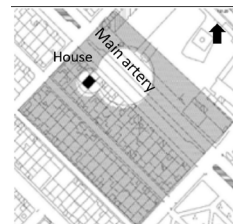

Housing Period: Traditional

Explanation of model: in traditional housing, elements constituting the body (shared materials, integrated decorations, suitable skyline, common concepts in the architecture of spaces, etc.) are matched and coordinated to provide both diversity and coordination.

Housing Period: Contemporary

Explanation of model: in contemporary fabric, housing is located in crowded arteries and routes decreasing the peace of residents and commercial, administrative, residential, and other uses cause visual distortion.
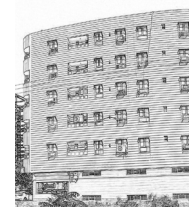

Housing Period: Traditional

Explanation of model: in traditional fabric, a suitable location has been considered for housing to be separated from other uses in crowded areas, which provides peace for residents and individuals who live in environments with specific activities. Moreover, commercial uses located near the residential fabric reduce the visual distortion and interfere with other uses leading to peace and comfort.
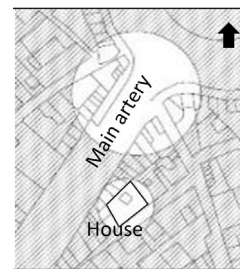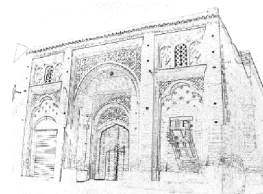

Housing Period: Contemporary

Explanation of model: lack of attention to adjacent façade, architectural decorations, and other physical elements of contemporary housing cause a lack of visual comfort.
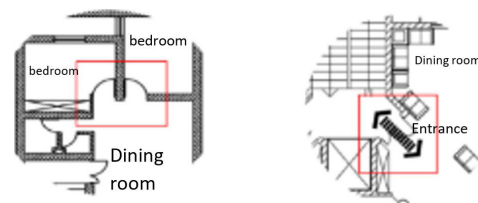

Housing Period: Contemporary

Explanation of model: integrated brick decorations and adjacent facades in traditional housing have provided visual comfort. Moreover, brickwork in the fabric and homogenous decorations provide coordination and regularity in the visual organization of the traditional fabric view.

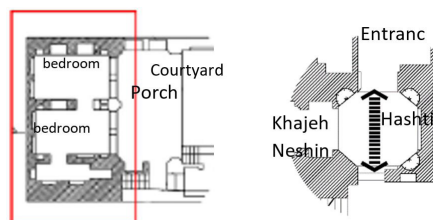## 4. Permeability and Privacy

Housing Period: Contemporary

Explanation of model: lack of attention to hierarchy and access of users to important residential spaces without any preparation and change in space arrangement concepts lead to a reduction in the privacy rate of contemporary residential architecture.
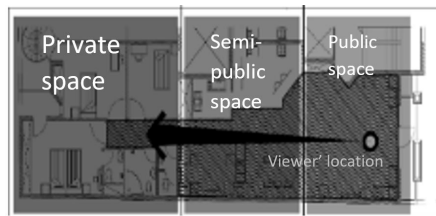
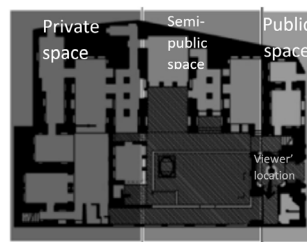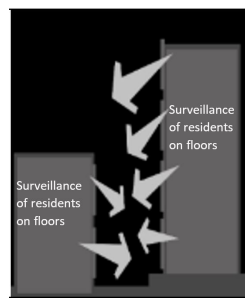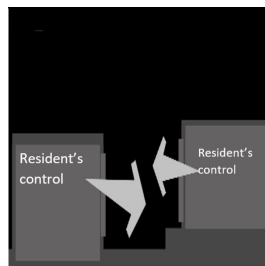| Housing Period: Contemporary	
Explanation of model: attention to the hierarchy of different residential spaces, location of private spaces on the last floors, and space division have increased privacy in traditional housing.	
Housing Period: Contemporary	
Explanation of model: privacy of spaces has been reduced due to the direct view of the viewer's overall public, semi-public, and private realms and integration into some contemporary residential architectures.	
Housing Period: Traditional	
Explanation of model: privacy has been reduced in this kind of housing regarding the suitable division of housing spaces and lack of direct view of the viewer over different realms.	

5. Surveillance and Control

Housing Period: Contemporary	
Explanation of model: high density in housing and residents' dominance over arteries increase surveillance and environmental control leading to the comfort of pedestrians out of the house.	
Housing Period: Traditional	
Explanation of model: reduction in density relative to employment rate and lack of residents' control over the environment leads to lower control of the environment.	

6. Income and Economy

Housing Period: Traditional

Explanation of model: income level of households living in traditional housing is less than those living in contemporary housing. However, the satisfaction rate of this period is higher. The reason is that the income level ad daily needs of people were matched and households had similar affordability.

Housing Period: Contemporary

Explanation of model: income level of this period has increased widening the gap between different walks of society. This issue has appeared as incoherent houses in architecture causing dissatisfaction in the house.

7. Space Experience

Housing Period: Traditional

Explanation of model: The positive memories of the traditional housing environment have led to higher satisfaction in this period compared to contemporary housing. The reason is that public spaces and social communication have been important and created memorable experiences in residential environments.

Housing Period: Contemporary

Explanation of model: reduction in the quality of public spaces in contemporary housing has reduced positive experiences in residential environments. Hence, satisfaction with this criterion has been reduced in contemporary housing.

According to Table 6, it can be explained that residential spaces have had different qualities in various periods. Moreover, the reviewed components led to this difference indicating that traditional housing had higher quality levels in terms of spatial dimension and size, visual and environmental comfort, permeability and privacy, economy and income, and positive experiences. On the other hand, the quality of space legibility, surveillance, and control was higher in contemporary housing rather than the traditional housing.

6. DISCUSSION AND CONCLUSION

According to reviewed theoretical foundations, security can be considered based on two objective and subjective aspects indicating the nature and effect of each criterion in a comparative study. Therefore, satisfaction resulting from security provides needs of users-around 71.4% by traditional housing and 28.6% by contemporary housing- based on the criteria affecting the response to these needs. It is worth noting that a percept of security components of Dezful houses can be found in the contemporary body. Hence, these components must receive great attention. Therefore, it is possible to create a desired and qualified environment for residents by aggregating and placing different security aspects in the architecture, which enhances the activities influenced by the architectural environment providing comfort for individuals by reducing crime and criminality. Accordingly, some strategies can be presented as follows to improve the contemporary housing of Dezful based on the experiences of the traditional body and obtained findings:
- Entrance gates of buildings must be designed in a way not to destroy the legibility of contemporary housing while providing indoor privacy.

- Spatial diversity in contemporary housing must be provided based on the various space sizes and space size must be matched to the performance of that space.
- Wall, form, and arrangement of residential spaces must be far away from the main routes to reduce noise.
- Physical principles must be considered in the residential architecture façade to be harmonized with adjacent buildings in terms of materials, form, and size to create a skyline. This case creates harmony and homogeneity in the urban landscape.
- The realm and area of residential spaces must be designed considering privacy and the hierarchy of access to different spaces.
- All spaces of the house must use daylight equally.
- Using all physical elements, such as Pirneshin (a platform designed in outdoor space to sit on it), semi-open space, and landscape elements (pond, etc.) in traditional architecture to meet functional needs and contribute to desired space perception.
In addition to the abovementioned points, lack of place legibility in traditional housing and surveillance in the routes can be considered factors reducing security in traditional housing, the landscape of which can be considered in urban renewal plans. According to the results of this study, the most important indicators of realizing security in the traditional housing of Desful are as follows based on their ranks: visual and environmental comfort, space legibility, economy and income of households, surveillance and control, privacy, space dimension, and perception.
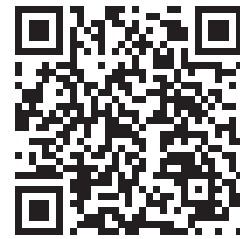
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