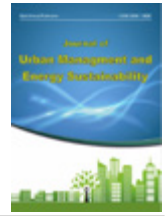


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CASE STUDY RESEARCH

Explaining the role of In-Between Spaces in increasing the quality of life (Case study: Ekbatan, Atisaz, and Hormozan residential complexes)¹

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ABSTRACT

The in-between space includes the spaces that connect public and private spaces and are used everywhere and under supervision, proving that these spaces are somehow creating ambiguity and conflict on the border of territories and possessions. In residential complexes, by defining the in-between space, the connection between the inside and outside space is created in the form of a logical hierarchy, and the environment outside the public street and neighborhood spaces become more private with a hierarchy until they reach the inside of the house. The method of research includes a qualitative approach and it's based on descriptive-analytical with content analysis and a combination of inductive and comparative methods. To compare the nature of the residents' behaviors, the data was collected through behavioral perception research tools and questionnaires. The collected data is a comprehensive picture of the case studies (Ekbatan, Atisaz, and Hormozan residential complexes) with a focus on the influence of the features related to the middle space in the configuration of the selected residential complex in terms of existence or non-existence of space, middle layout, and their proportions. The result of the ranking done by the TOPSIS method has determined that the order of closeness to the ideal state is among Hay residential complex, Atisaz residential complex in the first place, Hormozan complex in the second place, and Ekbatan residential complex as the farthest complex from the ideal state and it is in the third place.

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1. INTRODUCTION

The in-between space is the area that is located between the outside and the world inside the house and is like a transition space between the house and the street, which in residential areas includes the semi-private and semi-public territory and acts as a connector between public and private areas. There is no discernable physical difference between walking through the door one way or the other, but the response in our experience of space is vastly different (Bloom, 2005). Some researchers have focused on inside/ outside relationships as public/private dual and have defined this kind of space as an “intermediate area between the public area outside of a house and a private area on the inside” (Maliki et al., 2015). Ismail (2012) has mentioned: “A half-public, or half-private kind of space can be profoundly meaningful to users. The built environment is influenced by culture, belief and past experiences of its inhabitants”. Some studies also have considered in-between space design as a cultural subject dependent on this context.

It is through the implementation of a boundary and a connection that ultimately can turn a space into a place (Lo, 1986). Space can be considered a system of relationships between objects. The space between objects is not just a space, the spaces between are necessary to recognize objects, without these spaces independent recognition of objects is not practical, and apart from that, the space between plays a very important role in the relationship of each element with each other (Balilan & Sattarzade, 2015) this space is a part of both realms at the same time, which is defined by these two and on the other hand defines them (Grotter, 2013). It is obvious that the private space defines the boundary or private territory of one or more people and the public space shows that the components of the in-between space of residential complexes belong to everyone. But the debatable issue between these two spaces (Tavasli, 2004). which has the role of connecting the inner and outer realms, so the concept of the in-between space is meaningful about the concepts of inner and outer. The importance of inside/outside relationships and their impact on forming in-between spaces is been said and therefore demands this kind of space as one of

the complicated elements of architecture must not be neglected; this element as a subsystem of architecture must respond to the needs that Lo (Lo, 1986) believes that architecture must serve (Brookes, 2012): Physiological Demands for – light, air, sun, the filtering out of climatic extremes, and generally protection from the hazards of the outside: to ensure both the short and long term survival of the individual. Psychological Demands for – privacy, contact with others and contact with the environment, a sense of security, identity, and orientation: to add meaning to the life of an individual. Here it is the presence of our emotions that separates a “building” from “architecture”.

Taleghani et al. (2012) have said: “Transitional spaces are potentially and traditionally efficient ways to moderate indoor climate with the free sources available from nature. These kinds of spaces are recently being considered from the comfort point of view.” Maragno and Roura (2010) have mentioned: “These spaces can help to ensure environmental quality in buildings while rationalizing the use of energy and materials”. But it must be mentioned that beyond a simple preference for inside-outside spaces based on lifestyle patterns or climatic comfort, there is a growing argument for an aesthetic affinity for these ambiguous spaces that transcend the conventional dualistic architectural amalgam of internal space and external form (Skinner, 2013). The aesthetics of horticulture, architecture, and city planning begins only when a man deliberately has created a distinction between inside and outside. This distinction enables the parts of the relationship to be defined and in turn the completeness of the relationship, the whole that is space to be recognized (Arnheim et al., 1966).

2. MATERIALS AND METHODS

2.1. *In-between Spaces in Residential Environment*

In residential complexes, by defining the in-between space, the connection between the inside and outside space is created in the form of a logical hierarchy, and the environment outside the public street and neighborhood spaces

become more private with a hierarchy until they reach the inside of the house. In this way, the conditions of transition from inside to outside as well as physical and mental preparation are provided for people using the space. (Heidari, 2013) Therefore, the existence of the in-between space as a transitional space creates an articulation between the private and public environment so that what is private is distinguished from what is public, so in case of the removal of the in-between space or the lack of this space from the physical dimension, the connecting links between the two arenas inside and outside are not defined. The in-between area in residential complexes includes the spaces between the street and the door of the residential unit. (Montgomery, 2020) Spaces such as the sidewalk in front of the entrance of the compound, the sidewalk inside the complex, the open parking space, the semi-open space of the area, and the lobby are the components of the in-between space and the hierarchy. An access space from the street to the residential unit in the complexes is created by these spaces. (Zarghami, 2016)

According to what was said, the hierarchy created between the street and the entrance door, the unit represents the type of in-between space of the complex. Therefore, the number of components of this space and their quality somehow indicate the quality of the in-between space. Therefore, the quality of this space can be measured carefully in the way of creating a connection between the inside and the outside of the complex. According to this, complexes with a more defined spatial hierarchy between the inside and the outside will have a stronger intermediate space than other complexes. The preliminary examination of the in-between space in residential complexes in this research shows that the hierarchy of access from the street to the entrance of the unit in residential complexes is manifested in different ways and with different components of the in-between space. (Kaef & Zebardast, 2016)

The between is a conquering between two belligerent territories: Strange, infiltrated, camouflaged, between is not necessarily a residual space like the void between two volumes, but rather in complex geometries, it may be a

substantial place; the place where the geometry “inhales and exhales”; a place of synchronic ambiguities. Of interest is, in fact, this “gasket” capacity of the interstitial void implicit in these irregular configurations. This possible rhythm among the occupied, the omitted, and the linked: fills, voids, and links or articulations, that is to say, surfaces, points, and lines that interrupt spatial sequences and combinations. The void, thus, does not separate but joins” (Gausa et al., 2003). Thus, the in-between spaces in a residential environment are the empty-full sequences from the most outer toward the most inner spaces in an environment (Fig.1).

It defines three levels of in-between spaces that are between the outer and inner territories of blocks in a residential environment: the outer confine is between blocks and the inner confine is between inside and outside of a block. The three levels are:

1. Spaces in the inner confine of a residential environment between one block and adjacent blocks.
2. Spaces in the inner confine of the residential environment between a block and its outer confine.
3. Entrance of one block that is emplaces between its outer confine in a residential environment and its inner confine inside the block.

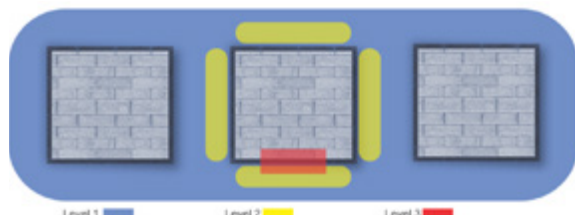


Fig. 1: Levels of in-between spaces in a sequence from outer spaces in a residential environment toward inner ones of a block (Moeini & Einifar, 2022)

2.2. Quality of life approach

The concept of “quality of life is strongly rooted in thinking about health. In Newman’s model, health is considered an indicator of life ability. While in other models, the quality of the environment is discussed as a determinant of health, in the Ivm model, health is defined as genetic factors, the nature and how to maintain

health, lifestyle behavior, and the quality of the physical and socio-cultural environment. In a schematic model presented by Ivm, health, and quality of life are equivalent to two separate dimensions of life ability. This model measures a combination of measurable dimensions, the physical and spatial culture of the environment, and the individual's perception of these elements. The individual perception of Qaft is not formed by the objective and visible characteristics of the environment, but conceptual and personal dimensions are also effective in this. This model is placed in the field of intellectual models and does not clarify the relationship between different elements; Rather, it represents layers of concepts related to each other. (Mitchell, 2001) believes that there is no agreement on the concept of quality of life, neither in terminology nor in inventing methods and criteria that can be used to determine the quality of life. In this approach, the quality of life is a collection of elements, environmental health, physical reserves, natural growth and individual prosperity, and a sense of security. It is interesting to note that in this approach, there is no mention of the economic field, while other perspectives consider this field as one of the pillars. They consider the main quality. The later model presented in the field of quality of life is Chung's (1997) model, which discusses the different dimensions of a desirable life. The foundation of this model is based on four ethical theories. The hedonism of the dialectical vision of humanism and formalism. This model is completely dependent on the physical environment and it can be considered as a supplement due to the mutual effect of perceptions that induces a sense of desirable life (van Campetal, 2003).



Fig. 2: Elements and components of quality of life

Based on the diagram provided by Mitchell 2000, the elements and components of quality of life and constructive variables of them are:

- Health The overall health of any human society is the product of the physical and mental health of its members.
- Security in the work of security is formed by factors such as the execution of justice in the case of criminals, the safety of the living environment, individual economic security, and the existence of conventional and regular life.
- Personal growth, benefiting from sufficient opportunity for entertainment makes it possible to spend leisure time suitably and desirably and the educational and learning process as a whole to achieve the goal of personal growth and transformation.
- Social development: the realization of the goal of growth and development in any society depends on factors such as the quality of political participation, citizens of social networks and collective interactions, and the structure of the desired societies.
- Natural resources, goods, and services
- Physical environment, about the components of the physical environment, it is necessary to pay attention to variables such as visual perception and the quality of the landscape, water, and air pollution, and environmental noise (Mitchell, 2001).

Quality of life in the settlement based on the in-between space

In the structure of residential environments, the physical structure formed by a system of internal, external, and intermediate spaces in successive scales is the basis of the organization of spatial communication, which leads to the coherence of the physical structure of the environment in the middle scale compared to the smaller scale and the sheriff scale of residential units. so that internal relations Interaction creates a series of spatial relationships, and based on this, the larger scales affect the middle and smaller scales. This relationship is interactive, which means that in this system, smaller scales are also scales That affect the sheriff. This relationship is the same communication characteristic of the intermediate spaces, which is in the form

of three patterns of communication connection and transmission based on the principles Because definability with spatial boundaries and thresholds, contiguity, spatial continuity, and spatial sequence, and separation and integration, spatial form the physical structure of the settlement's environment (Maeni, 2011).

The physical elements of the middle space help in understanding the border of adjacent spaces and especially the interior and exterior spaces. What makes a space socially active is primarily the physical factors (access, visual attractions, natural factors, etc.) According to Kaplan (1998), the physical qualities of public space in general with the way of access, and the position of physiological comfort in the conditions In addition, there are natural elements in public spaces that increase excitement and the vibrancy of the environment and inviting passers-by to these spaces, providing the possibility, rest, pleasant experiences and health for people are also

very important, (Mir Salami, 2020) elements such as corners and corners, stairs, suitable physical opportunities for sitting alone and pausing And more reflection in the space away from the noise of definition The bodies and the identity of the walls for the spatial independence of the person, access control and security, defining the territory, effective ways to preserve the space in public places. and other factors among the influencing factors in the promotion of the physical aspects of private space in public places are considered to be White (1980) design qualities such as space integration, dimensions, proportions, adaptability and compatibility of space, type of geometric formal organization, static and dynamic points, spatial enclosure, physical and spatial continuity, spatial hierarchy, the manner of accesses and the position of thresholds. Inputs can also be effective in the perception of the space as a whole and as a result, have a favorable effect on human perception (Pakzad, 2005).

Table 1: The components emphasized by thinkers regarding the in-between space

Theorists	Year	Concepts			
		Identity	Security	Territory	Social interaction
Lang	2011	crime reduction			
Einifar	2011	Identity			Social confrontation
Balilan	2011			Territory control	
Jhiksen and Hiling	2009		Preventing crimes	Defense of the territory	
Gaemmagami	2009				social stability
Hijer and Rijen-drap	2001				Face people with each other
Noureddin	1998				social interaction
Seyedsadr	1998			Territory control	
Tavassoli	1997		Watchful		social life
Yan Ghel	1996		security	A sense of territory	Community Relations
Brown	1985	Identity			sociability
Bruer	1983		security		
Altman and Gawin	1982				social unity
Newman	1973			A sense of territory	
Alexander	1965			territorialism	

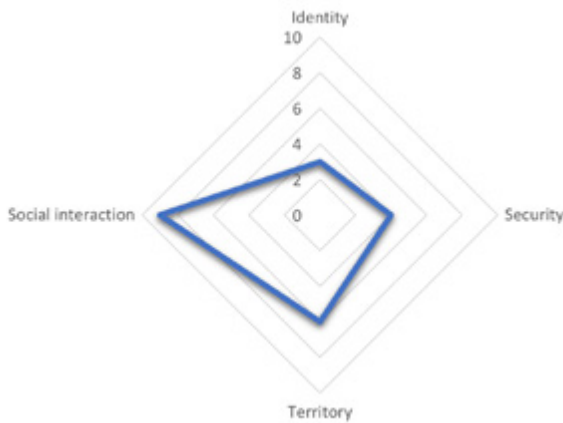


Fig. 3: The amount of emphasis of thinkers on the components of the in-between space

2.3. In-Between space evaluation Components

About the middle space and its role in residential environments, research has been conducted by researchers, all of which have made references to the concepts affected by the middle space. Table 1 summarizes these theories. The common points of these researches are the concepts that form the theoretical basis of this research.

These concepts include social interaction, territory, identity, and security, which in each of the previous research, only the connection of one or more of them with the middle space has been mentioned. Since the purpose of this research is to investigate the relationship of all the above concepts with the middle space, the sum of these concepts has been named under the title of environmental human qualities. Below is a brief definition of each of the mentioned concepts.

2.3.1. Security

Security factors in public environments depend on various conditions. The creation of such features in the environment, especially in highly used spaces, leads to a sense of attachment and interaction in the collective space and leads to the improvement of the quality of the environment. (Soleymani, 2017) Theorists including Oscar Newman with his theories in creating a defensible space and Geoffrey in determining strategies to

deal with crime through environmental design, in creating safe spaces by controlling the space in various ways, emphasizing the improvement of the level of visibility of the environment, preventing the complexity of the space, or in other words Readable environments, especially in collective and crowded uses, are among physical environmental solutions to reduce crime and create security in space (ibid). (Montgomery, 2020) Residential satisfaction can be considered as a situation in which, in addition to physical issues and facilities, residents also pay attention to social and cultural issues and relationships between residents, and are satisfied with the quality of their residential environment, and the evaluation criteria of their residential environment is an acceptable limit. It is the living environment that is used as a criterion for evaluating residents (Choudhury, 2005).

2.3.2. Social interaction

The identity community is interactive and meaningful, and the social world has personal meaning and significance for the people involved in it. Individual and social identities grow in the process of social interactions. We learn who we are and who we will become by interacting with others. According to Jenkins, an individual's identity that differentiates a person from others develops in society. The first socialization and social interactions that occur in all lifetimes make people able to associate themselves in the light of them (Jenkins, 2011) also social interaction responds to human needs to connect and feel belonging to a place. Every opportunity to achieve such a purpose must be evaluated positively. Another reason is that people's activities help the individual growth of human beings by creating the grounds of socialization and sociability (Leng 2004), paying attention to individual needs and the socialization of people causes the quality of living spaces. Unfortunately, in today's residential environments, due to the lack of attention to human needs and the qualitative design of the space, the social interactions of the residents have been weakened. According to what was said and the response to human needs, creating spaces to create activities and social interaction between people in urban spaces, residential

environments, and neighborhoods is essential. Outdoor spaces are one of them. These spaces are created to interact with others to create the possibility of encounter and potential (Durker & Gumpert, 1998). An outdoor space with Quality can create social interaction by attracting people to come and stay in the space. The more people spend time on outdoor activities, the more willing they are to participate in collective activities (Knack, 2000). Research shows that such spaces can increase social interaction among residents, in other words, people go to outdoor spaces due to their need for social interaction – (Cooper & Francis, 1998). These outdoor spaces are part of the middle space in residential complexes.

2.3.3. Territory and privacy

A spatial territory is a limited space that individuals and groups use and defend as their exclusive territory. The territory finds a psychological identity with a place and becomes a symbol with a sense of ownership and physical composition (Pastalan, 197088). Irwin Altman has presented a category of territory in which three types of territory “primary”, “secondary” and “general” have been proposed (Altman, 2002, 138-145). Also, in a similar division for spatial territories, Newman defines the hierarchy of spatial territory in terms of whether it is private or public, private space, semi-public space, and public space (Newman 1996:58). Territory is one of the mechanisms of monitoring the border between self and others and a means to achieve the desired solitude if solitude and the mechanisms associated with it are neglected or used flexibly in the design or if the meaning of different layers Personal space and territory should be forgotten, people are forced to struggle with the environment until they reach the desired border of interaction from their point of view. Pakzad 2014 It follows a certain hierarchy. In defining such a hierarchy, one should pay attention to many meanings. When talking about boundaries and their preservation, it is clear that this word does not have a fixed meaning and includes broader meanings (Bahreini, 1999) 22 Research conducted by researchers shows that the territory is one of the factors affecting the quality of the place of human life. and their relationship with

the natural environment. Therefore, residential environments require spatial, functional hierarchies, etc., which are closely related to the concept of territory. Since the middle space is also formed by defining the areas between inside and outside, Therefore, the relationship between it and the concept of territory is significant.

2.3.4. Identity

Identity is a feature of the environment that has different dimensions and approaches. How people or the environment communicate is very effective in forming the identity of a place. In other words, there will be no connection and feeling of belonging between a person and his living environment unless he can deeply recognize and recognize it and can understand its distinction from other environments (Qutabi, 2017, 81), in this research, The concept of identity has been discussed from its spatial dimension, i.e., spatial identity. The identity of a place is the result of the differences and similarities of a place compared to other places. As an urban designer, Kevin Lynch considered the city space as a territory for life and identity search (Fakuhi, 2004). Spatial identity is a part of the infrastructure of human individual identity and the result of general knowledge about the physical world in which he lives; therefore, the balanced relationship between a person's spatial identity and the characteristics of his surrounding environment is very important (Behzadfar, 2006, 65) The term spatial identity contains three concepts. The place of identity and the territories of authority are builders of these two concepts, people always refer themselves to the city, region, or country where they live. People refer more to physical environments as places, so the social environments of their living places determine their human and behavioral characteristics to some extent. The opposite is also true. Places are influenced by human identity. (Naser & Kang, 1999, 205).

2.3.5. Physical and structural

In the structure of residential environments, the physical structure formed by a system of internal, external, and intermediate spaces in successive scales is the basis of the organization of spatial communication, which leads to the coherence of

the physical structure of the environment in the middle scale compared to the smaller scale and the police station scale of residential units. So interactive internal relations create a series of spatial relations and based on this, the police scales affect the middle and finer scales. (Maeni, 2011). The physical elements of the middle space help in understanding the border of adjacent spaces and especially the interior and exterior spaces. What makes a space socially active is primarily the physical factors (access, visual attractions, natural factors, etc. According to Kaplan (1998), the physical quality of a public space is generally related to the way of access, and the position of physiological comfort in different conditions. In addition, the presence of natural elements in public spaces increases excitement The vibrancy of the environment and the invitation of passers-by to these spaces provide the possibility of rest, pleasant experiences, and health for people and are also very important (Mirsalami, 2020). More reflection on the space away from the commotion of the collective definition of the bodies and the identity of the walls for the spatial independence of the individual, access control and security, defining the territory, effective ways to maintain the space in public places and other factors are among the influential factors in improving the physical aspects of the space. (White, 1980)

2.3.6. Functional and activity

Studies show that structural and physical factors are necessary conditions for the quality of spaces, but they are not sufficient on their own. The functional characteristics of residential spaces can affect the quality and quantity of residents' presence to stop and concentrate in these spaces. The presence of enough spaces to sit and be alone away from the noise, a collection of cozy events in the middle scale, as well as a space for personal solitude and studying and doing personal things, and on the other hand, friendly association and interaction in the middle spaces add to the quality of these spaces (Zimmerman, 2008) at the same time, the activity dimension of the residential spaces is also related to the surrounding activities and uses. Studies show that in many cases, residential units have transferred this to the service spaces of the settlement, such

as stairs, corridors, etc., due to the high density of households and the lack of observance of auditory and visual privacy, and residents choose these places for privacy. Also, in public spaces such as the lobby, where people can be in the environment by looking at others, sitting, eating, moving activities, cozy events, or in the words of (Woolley, 2003), active and passive recreation, these activities and many activity characteristics and Another body gives personality to the public spaces in the settlements and is effective in providing comfort and the possibility of attachment of people from being in the settlement space, which leads to an increase in social solidarity and as a result more satisfaction. In general, the prevailing activities in spaces Public includes mandatory activities (such as passing through spaces to access different parts of the sense of optional activities depending on the quality of the space), social activities, experiencing other people, and active and passive participation in the environment that makes the space lively (Daneshpour, 2014) and It is expressed by three factors; Functional and group characteristics of users, the amount of contact and communication of people in the place, the amount of participation in group activities and collective ceremonies (Brown & Werner, 1985).

2.4. Methodology

The upcoming research has a qualitative approach and its method is descriptive-analytical with content analysis and a combination of inductive and comparative methods. The current study, using the multiple case study approach, seeks to explain and evaluate the role of intermediate spaces in increasing the quality of life in three selected residential complexes in Tehran. This study uses both quantitative and qualitative methods in data collection. To compare the nature of the residents' behaviors, the data was collected through behavioral perception research tools and questionnaires. The collected data is a comprehensive picture of the case examples with a focus on the influence of the features related to the middle space in the configuration of the selected residential complex in terms of the existence or non-existence of space, middle layout, and their proportions; such as courtyards, lobbies, corridors, etc. on the

behavior of its users. In the correlation strategy, it is determined whether there is a relationship between two or more measurable variables and if this relationship exists, what is its size and extent. In the correlation strategy, phenomena are studied in their natural conditions, and the researcher's effort is to understand and interpret the phenomena from people's points of view. The characteristics of the middle spaces of residential complexes are the independent variable and the quality of life of the residents is the dependent variable. With the help of the comparative strategy, the degree of influence of

the characteristics of the independent variable on the dependent variable will be taken. According to the statistical population and previous explanations, the sample population; Ekbatan Phase 2 residential complex, Atisaz residential complex, and Hormzan residential complex were selected for this purpose. In total, 150 questionnaires were filled out among the statistical sample, and 132 questionnaires were filled out by the residents. Three selected samples from three morphologically different species were selected from among the largest residential complexes of the Tehran metropolis.



Fig. 4: Pictures of external, internal, and middle spaces of the Ekbatan residential complex

Ekbatan Residential Complex

Ekbatan settlement consists of many residential complexes which are divided into different phases. The settlement consists of three different phases, and in each of these phases of Ekbatan settlement, there are different blocks. Ekbatan town has 33 blocks and 15675 residential units. The first phase of the Ekbatan settlement

consists of 10 blocks, which are named ABC Blocks. These blocks are divided into two separate parts by the Tastgardi Stadium (PAS) and the railway, and the name of each of these groups is different. The first part, which has 4 blocks and is located in the north of the stadium, is called the upper blocks, and the 6 blocks in the south of the stadium are called the lower blocks.



Fig. 5: Pictures of external, internal, and middle spaces of Ati saz residential complex

Atisaz Residential Complex

In 1976, in line with the high-rise activity, the construction was completed and delivered in three stages of the huge and unique residential tower complex of Ati Saz Evin, 23 towers of 12 to 32 floors, which include a modern 2-story commercial center, a swimming pool, and a separate sauna.

Green and Waterfront, playground, children, passenger and cargo elevators, complete shooting and garbage collection system, fire extinguishing system, intercom, lightning rod central antenna network, and educational space from preparatory level to pre-university level.



Fig. 6: Pictures of external, internal, and middle spaces of Hormozan residential complex

Horizon Residential Complex

Horizon Towers were planned as 17 towers of 14 to 18 floors in the initial plan. In this plan, in addition to the green space, there were also educational, commercial, and sports uses to meet the needs of the residents. At present, this residential complex has 7 towers, which vary in height from 12 floors to 33. The last of them was the 20-story Nagin and Nastern towers, but the 33-story Zarin tower made it the largest tower in this complex. In total, this phase has 311 units.

structured written questionnaire including a five-point Likert scale, which has been used to measure each variable from the researchers' questionnaires and sources. In this part, to check the descriptive information of the research findings, the average standard deviation, and the observed number of subjects in the variables of the current research related to any variables in the descriptive table and to check the simple relationship between the research variables related to any of the correlation matrix tables between the variables in the form will be reviewed separately.

3. DISCUSSION AND FINDINGS

The measuring instrument of this research is a

Table 2: Current state of the quality of physical and spatial components

The current state of the quality of physical and spatial components								
Residential complex name	Frontage	Complex entrance	Street	Sidewalk	Parking	Outdoor	Block entrance	Block lobby
Ekbatan	4	2	2	2	2	4	1	1
Atisaz	3	4	4	4	3	2	3	3
Hormozan	2	3	3	3	3	3	2	4

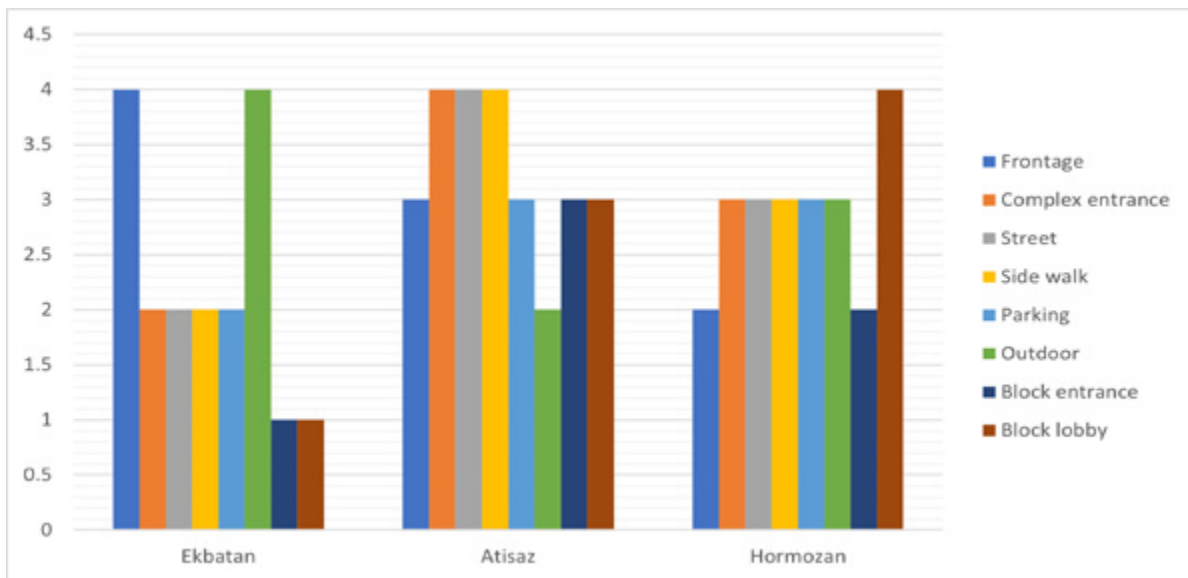


Fig. 7: Comparison of the existing quality of physical and spatial components

Table 3: The result of evaluating the quality of life in the studied residential complexes

	Ekbatan	Atisaz	Hormozan	stdev	var	average
The amount of space used	2.25	3.25	2.875	0.505181	0.255208	2.791667
The number of activities	1.42	2.63	2.13	0.60803	0.3697	2.06
The quality of each part	2.14	3.12	3.24	0.603435	0.364133	2.833333
Importance to the complex	2.36	3.52	3.74	0.74144	0.549733	3.206667
Proud of the complex	1.96	3.85	4.2	1.205003	1.452033	3.336667
Announcing the name of the complex	2.3	4.27	4.52	1.215991	1.478633	3.696667
Migration from the complex	4.63	2.4	1.85	1.472175	2.1673	2.96
Complex security	2.15	4.38	4.62	1.36207	1.855233	3.716667
Disturbing strangers	3.84	1.36	0.68	1.66325	2.7664	1.96
Recognition of strangers	1.74	2.29	2.36	0.339559	0.1153	2.13
Safety of car movement	3.8	3.95	4.12	0.160104	0.025633	3.956667
Privacy	2.16	3.17	3.29	0.620672	0.385233	2.873333
Noise	1.37	2.14	2.03	0.416453	0.173433	1.846667
Private space inside the unit	3.5	2.16	2.31	0.734189	0.539033	2.656667
A view of living spaces	1.48	3.62	2.36	1.075608	1.156933	2.486667
solitude	3.47	1.84	2.51	0.819288	0.671233	2.606667
Leisure time with neighbors	2.47	1.92	2.18	0.275136	0.0757	2.19
Meeting with neighbors	2.54	2.63	2.4	0.115902	0.013433	2.523333
Communication with neighbors	1.4	1.83	1.36	0.260576	0.0679	1.53
The rate of visiting your neighbors	2.48	1.02	0.83	0.902792	0.815033	1.443333
The amount of disturbance and interference of neighbors	2.14	1.18	0.52	0.814616	0.6636	1.28
Participation in solving its problems	1.62	1.02	2.45	0.718076	0.515633	1.696667
Friendly behavior of neighbors	2.27	2.17	2.39	0.110151	0.012133	2.276667
Trust in neighbors	1.87	1.42	0.73	0.574195	0.3297	1.34
The character of the neighbors	2.17	3.28	3.62	0.75831	0.575033	3.023333
Neighbors' behavior and culture	1.43	3.41	4.21	1.43113	2.048133	3.016667
Knowing the neighbors of the block	2.14	1.03	0.75	0.735142	0.540433	1.306667
Knowing neighbors in other blocks	1.02	0.26	0.19	0.460326	0.2119	0.49

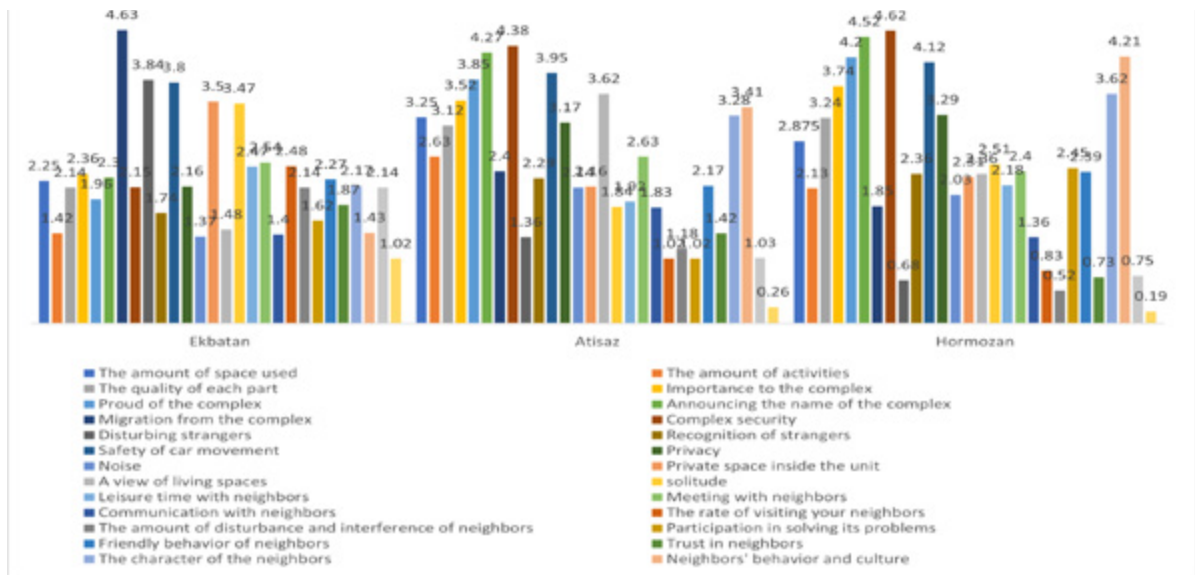


Fig. 8: Comparison of quality-of-life components in the studied residential complexes

Table 4: Unscaled values of evaluating the spatial elements of the middle spaces of the studied residential complexes

Linear scale-free			
	Ekbatan	Atisaz	Hormozan
Frontage	0.4444	0.3333	0.2222
Complex entrance	0.2222	0.4444	0.3333
Street	0.2222	0.4444	0.3333
Sidewalk	0.2222	0.4444	0.3333
Parking	0.2500	0.3750	0.3750
Outdoor	0.4444	0.2222	0.3333
Block entrance	0.1667	0.5000	0.3333
Block lobby	0.1250	0.3750	0.5000

Table 5: The distance of the unscaled values of the evaluation of the spatial elements of the middle spaces of the studied residential complexes from the negative and positive ideals

The distance from the ideal limit is positive and negative				
		Ekbatan	Atisaz	Hormozan
Frontage	Negative	0.049383	0.012346	4.93E-32
	Positive	1.97E-31	0.012346	0.049383
Complex entrance	Negative	0.0000	0.0494	0.0123
	Positive	0.0494	0.0000	0.0123
Street	Negative	0.0000	0.0494	0.0123
	Positive	0.0494	0.0000	0.0123
Sidewalk	Negative	0.0000	0.0494	0.0123
	Positive	0.0494	0.0000	0.0123
Parking	Negative	0.0000	0.0156	0.0156
	Positive	0.0156	0.0000	0.0000
Outdoor	Negative	0.0494	0.0000	0.0123
	Positive	0.0000	0.0494	0.0123
Block entrance	Negative	1.11E-31	0.111111	0.027778
	Positive	0.111111	0	0.027778
Block lobby	Negative	0	0.0625	0.140625
	Positive	0.140625	0.015625	0

Table 6: Ranking of the studied residential complexes based on the amount of spatial quality obtained from the evaluation

Prioritization based on the closest option to the ideal			
	Ekbatan	Atisaz	Hormozan
di+	Ekbatan	Atisaz	Hormozan
di-	0.222222	0.536658	0.470175
Cl	0.6446	0.254966	0.277778
Rank	0.2564	0.6779	0.6286

4. RESULT AND CONCLUSION

In this research, to evaluate the quality of life in three residential complexes of Ekbatan, Atisaz, and Hormzan, two types of investigations have been carried out, and the findings obtained from these two parts have obtained different information. In the first part, which includes the main attitude and approach of the research, the spatial elements that make up the in-between spaces in residential complexes have been evaluated. These elements include; the frontage, the entrance of the complex, the street, the sidewalk, the parking lot, the outer space of the block, the entrance of the block, and the lobby of the block.

In this evaluation, the amount and consistency of residents' use of these spaces, as well as the quality of each space in each complex, were questioned and the results of the evaluation regarding each community were compared with each other. Table 2 shows the results of the survey regarding the mentioned qualities. Diagram 7 shows the differences and similarities of these three complexes in terms of the quality of different parts of the in-between spaces. As the data shows, there is very little similarity between the three residential complexes studied in terms of the qualities of their in-between spaces. In some of them, the special spaces of the parking lot and the hall have considerable quality, while in others this quality is lower than the desired level. However, explaining and determining the proximity of the quality of the middle spaces of these complexes to the ideal state requires the use of a quantitative model and ranking of the subject of study.

In the second part of the evaluation, the components of the quality of life in residential complexes have been evaluated through the manual. This evaluation has been done with a questionnaire that includes 28 parts, some of which have various items and multi-part information, which are finally summarized in the form of columns, and the average, variance, and standard deviation of each of them are shown in Table 3. given. Chart 8 shows the comparative comparison of the average result of the survey regarding each item. Examining graph 8 shows

that regarding some components of the quality of life, the two complexes of Atisaz and Hormzan have a remarkable qualitative similarity, while the residential complex of Ekbatan is different from these two and as can be seen in the graph, some cases show lower quality. This issue is mostly seen in cases related to social value and the place of the complex in the mental image of people.

Finally, as it was said, to determine the quality rating of the studied complexes from the point of view of the quality of life caused by the intermediate spaces, it is necessary to identify the closest option to the ideal state among them, and to examine the quality of the qualities in it. The result of the ranking done by the TOPSIS method has determined that the order of closeness to the ideal state is among Hay residential complex, Atisaz residential complex in the first place, Hormzan complex in the second place, and Ekbatan residential complex as the farthest complex from the ideal state and it is in the third place.

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