Assessing the Meaning of Housing Attribute Based on Meaning Structure Method; Case Study: Andisheh Mehr Housing, Ardabil, Iran*

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ABSTRACT

The quantitative aspects of housing have long been considered by the designers and policymakers of low-income housing. However, qualitative aspects and the residents' role in determining these aspects were neglected in many studies. The uniform housing in different regions, constructing the minimum housing disregarding the cultural differences and considering economic issues rather than paying attention to the qualities of life indicates the minimum consideration of the qualitative aspects of these cultural groups' housing. One of the qualitative concepts considered by the housing researchers is "the meaning of housing" from residents' points of view and identifying its determining components in the behavioral-environmental studies. Given the significance of meaning in establishing a relationship between the individual and the built environment, the current study considered the relationship between the individuals and the meaningful attributes of the environment and assessed the meaning of housing by identifying the meaning of the attributes of the internal space of housing and relationship between the individuals and these attributes. Thus, the case study was implemented in the 168-unit Mehr Housing Project of Andisheh, Ardebil. The current research utilized the "meaning structure method" as the research approach of the qualitative study using photography technique, field research, and semi-structured laddering interview. The research conceptual model described the consequences and meanings ruling the characteristics in the form of "attribute, latent function, the manifest function" using the means-end model of Gutman (1982) and levels of meaning of Rapaport (1988). The theoretical saturation determined the number of samples, interviews, and receiving data to ensure the required information. According to the hierarchal value map, the housing attributes were affected by "pleasant life". Other consequences provided the meanings such as "social relations", "independence", "privacy", "connection with nature" in the housing. The results also emphasized the fundamental values of the residents and the latent meanings regarding these attributes while presenting a structured framework to study the meaning of the housing attributes.

Keywords: Housing, Housing Attributes, Low-income Group, Mehr Housing.

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1. INTRODUCTION

By increasing the population in cities, the population of the low-income group and consequently, the demand for adequate housing and affordability of this group is increasing. Low-income housing has been long neglected in qualitative research, or false interpretations were stated regarding it. The uniform housing in every part of Iran, constructing the minimum housing disregarding the cultural differences and substituting the economic issues rather than paying attention to the qualities of life indicates the least consideration of the qualitative aspects of the housing of these cultural groups. In many parts of the world, the social housing projects were criticized due to their failure in meeting the final needs of the users. In most of these projects, considering the cultural differences among the residents, the housing attributes and characteristics could not meet the qualitative needs and the lifestyle of these groups and resulted in various physical and mental problems in different aspects for residents. The reason for this issue is that the conducted studies on providing housing for the low-income group in the third-world countries often focus on shelter and have considerably neglected the concept of housing (Huttman, 1993, p. 464). Given the raised issues, it is necessary to have a proper understanding of the qualitative needs of the particular cultural and vulnerable groups by the designers, architects, and housing policymakers and adapt the housing with these needs. One of the qualitative concepts emphasized by the housing researchers in recent years is the meaning of housing from residents' points of view and identifying its determining components in the environmental-behavioral research. Human settlement is based on the meaning and the purpose of the design, and constructing the housing is its meaning (Rapaport, 1990). Since the 1970s, with the emergence of the humanistic approaches in the environmental design theories, the meaning of the environment was considered as one of the key meaning in assessing the quality of the residential spaces in the housing literature (Ghalenoi, Salehinia, & Peymanfar, 2016, p. 58). When the inefficiency of the unilateral approaches of the architectural designs was manifested, the tendency to involve the user in determining and defining the quality of the environment increased and many researchers emphasized the consumer(resident)-based approaches rather than the features of the product (housing) (Sheth, 1983). Following this perspective, the concept of meaning had a considerable position in the theoretical discourses, and the meaning of housing became a significant research area in housing studies and behavioral-environmental research (Coolen, 2006). Nowadays, one of the designers' fundamental challenges is to achieve the organization of the meaning of housing and present the designs in accordance with the people's intended meanings. Such understanding is possible through a structured framework that studies the influential components in the formation of the meaning to each other. Many conducted studies on housing suggest that the meaning of housing lies in the functional relationship between the features of the environment and the values and meanings intended by the residents, and those features of the house are more considered by the people that play a more effective role in their achievement to the meanings and values (Coolen, 2006). Accordingly, the current study investigated the relationships between the individual and the meaningful attributes of the environment, considering the significance of meaning in establishing the relationship between the individual and the built environment. Then, the current research sought to extract the meaning of the features of the interior space of the house and the relationship between the individuals and those features by using a structured framework. In this regard, the following questions could be raised:

1. Do the characteristics of the interior space of the house have meaningful attributes for the residents?
2. What meanings do the residents attribute to the features of the housing?

In the current study, considering the exploratory nature of the problem regarding exploring the communicative structures of the characteristics of the interior space of the housing and its meaning, a qualitative research method was used. Qualitative research has different types, and by recognizing the subject and research problem, a proper method and tool can be selected to implement it. In the current study, the meaning structure method was used as a qualitative research approach to answer the raised questions and achieve different levels of meanings. The meaning structure is the developed example of the end-means model of Gutman (1982) by substituting the levels of meanings of Rapaport (1988) that considers the fundamental values of the residents regarding the housing attributes in addition to the functional meanings and studies the housing attributes in analytical propositions of the attribute, consequence (manifest function), and meaning (latent function). Using the meaning structure method and based on the presented conceptual framework, a qualitative case study was conducted in the residential area of Andisheh Mehr Housing, Ardebil City. In this study, various information collection methods were used, such as photographing the housing environment, drawing the maps of the housing environment, and assessment and analysis methods of meaning structure, such as semi-structured laddering interviews.

Implication Matrix and Hierarchal Value Maps (Gutman, 1982) were used to analyze and explore the residents' perceptions. The current study sought to identify the most significant attributes of the interior space of the housing from residents' points of view, explore the meaningful aspects of the attributes, study the latent and manifest meanings related to the attributes, and determine the relationship between these elements. According to the research findings,

it is expected that the researchers and designers can achieve a better understanding of the method of studying the meaning and qualitative aspects of the housing attributes and apply the most significant values and latent meanings desired by the residents to design the house for this cultural groups and improve its qualitative aspects.

2. THEORETICAL FRAMEWORK OF RESEARCH

In the current study, the theoretical foundations can be studied in the framework of the concepts related to low-income housing, the meaning of the built environment, and end-means theory.

2.1. Low-Income Housing in Iran and Position of Mehr Housing

Coinciding with the Industrial Revolution in the late nineteenth century, housing (especially for the low-income group) faced serious problems in many industrialized countries. Thus, the countries had to intervene and could resolve a part of the housing shortage required for the people of the society by entering the housing production and giving loans and financial subsidies to the constructors (Zabetian, Sadeghi, & Hosseinabadi, 2017). In the following, some of the key concepts related to the planning of providing housing for the low-income people were presented in summary: low-income groups: households whose monthly income is less than twice the minimum income of the subject of labor law or national employment law (Council of Ministers, 2009). Low-income housing: This is the housing, which is constructed as the production and supply projects of the rental housing, rental purchase, and assignment of the right of exploitation. Also, the units constructed by the housing charities and the supporting institutes are assigned with the end price (Council of Ministers, 2009). Social housing: this type of housing is developed by the participation of the government and to support the low-income groups. The purpose of developing this type of housing is based on two parameters: A) the minimum acceptable facilities, B) being at a lower level than the standards of the patterns of consumption of housing (Zabetian, Sadeghi, & Hosseinabadi). Social housing differs from other types of housing in several ways: First, this type of housing is provided without utilitarian considerations. Second, governments assign such units as their definition of "need" and the affordability to purchase or rent is not a determining factor in assigning the housing, and at the same time, it is not assigned to those in the worst housing conditions. Third, the political decision-making and the economic forces of the market have a significant effect on the quality and quantity of the social housing (Ahari, 1995). Affordable housing: the affordability indicates a controversy that every owner is obligated to create a balance between the actual cost or probable cost of his/her housing on the one hand, and the non-residential expenses, on the other hand. Australia's National Document (2005) described affordable housing as housing that can meet the needs of low-income households and is valued in a way to meet the primary needs of the owners as well (Gurran, 2008).

Developing countries face more affordable housing demand for the urban low-income households than the other parts due to the population growth and increase in the migration from the rural areas to the urban areas, and supplying housing for the low-income class has become one of the key issues of the governments in these areas (Momtaz, Rafeian, & Aghasifar, 2016). In Iran, paying attention to the housing of the low-income groups dates back to the beginning of the planning system in 1949. In the first and second 7-year development plan of Iran, credits were considered to produce affordable housing. However, no specific activity was implemented to settle the low-income groups. In the third development plan, affordable housing was considered for the low-income groups to eliminate the slums. In the fourth development plan, nearly one hundred thousand low-cost housing units with long-term installments were predicted in various forms of apartment complexes and cooperatives. After the victory of the Islamic Revolution, the plan of providing housing for the low-income groups was re-formed with the approval of the land assignment law and cheap materials and low-interest loans. Since 1998, the government implemented the social housing plan as rental housing. The government presented the second and third development plan of the non-government housing sector activities in three parts of free housing, supported housing, and rental housing. However, in the fourth development plan (2007), the government implemented the Mehr Housing Policy to meet the legal and conventional expectations on housing for the low-income groups. Mehr Housing was considered in the assignment of the right of land exploitation to construct small housing with an average floor area of 75 square meters per unit to reduce and eliminate the cost of land from the fixed price of the building to adapt to the financial affordability of the low and medium-income households. Given the concepts regarding the quiddity of social and affordable housing, Mehr Housing can also be considered affordable housing (Zabetian, Sadeghi, & Hossein Abadi, 2017). This plan was comprehensively implemented or is still being implemented in most of the cities of Iran. The inclusiveness of this plan and the high number of its target group indicate the necessity and significance of the current research subject.

2.2. Built Environment

The meaning of house was broadly studied, emphasizing its concept as a whole (Easthome, 2004; Kenyon, 1999; Moore, 2000; Sixmith, 1986). In addition to considering the concept of home as a

whole, Coolen believes that its meaning can be derived based on how residents use and experience housing attributes during the residence process. Meaning is not an intrinsic attribute of an object but is formed in the process of the interrelationships between objects and users (Coolen, 2007). As a result, an object can present various meanings for different users, and a diverse set of meanings can be attributed to the objects based on the various activities of users. Considering these assumptions derived from an ecological perspective[1], Coolen (2005) defines meaning as a functional relationship between the individual and an object. Rapoport also emphasizes the significance of meaning to perceive the built environment. According to him, the meaning, as a factor based on which the environment is formed and used, is the key mechanism in the relationship between the built environment and individuals. Every environment is related to various meanings, and the meaning reveals "the way of using the space" and forming the environment by individuals, and it is one of the most significant functions of the built environment (Rapoport, 1988;1990; 1995).

Various studies emphasized different levels of meanings in identifying the meanings in terms of the functional relationship between the user and the built environment. For example, Krampen (1979), in a study on the meanings in the urban environment in terms of semiotic, claimed that the attributes of the architecture of environment convey the meanings in two levels: the initial meaning perceived by the direct function of the object and the secondary meaning formed by the relationship between the individuals and object and through using it. Similarly, Rapoport (1988) classified the meaning of the built environment in three levels: high-level meanings, middle-level meanings, and low-level meanings (Table 1). The particular attributes of the built environment of the housing are the middle and low levels of meanings. However, the housing includes the high levels of meaning as a general concept (Coolen, 2007; Rapoport, 1988). It seems that individuals from various cultural groups attribute meanings in different levels to housing and its characteristics. Considering the diverse levels considered by the researchers on the meanings of the built environment, the current study sought to explore all the possible levels, including low-level meanings or "manifest function" and middle-level meaning or "latent function" for the attributes of the interior space of the housing in the case study.

Table 1. Different Levels of Meaning of the Built Environment from Rapaport's Point of View

Semantic Layers	Meaning of the Built Environment	Semantic Description of the Layers
High Level	Meanings related to the cosmology	Precognitive schema, world views, and philosophical systems
Middle Level	Latent aspects of activities and the behavior of the latent function	The functional and practical ability that is sometimes used rather than its primary function (identity, power, prestige, wealth)
Low Level	Daily and useful meanings "manifest function"	Material signs to determine the usage of each arrangement This level indicates the social position, expected behaviors, privacy, the degree of influence, etc. (access, privacy, living room arrangement, movement, etc.)

2.3. End-Means Theory

The means-end chain theory of Gutman (1983), as a theoretical and conceptual structure, attributes the individuals' values (meanings) to their selected behavior (activity) (Meesters, 2009, p. 22; Reynolds & Gutman, 1988). The main notion of this theory is that individuals select an option that has the desirable consequence and minimizes the adverse consequences (Gutman, 1982). According to this theory, the product is a means to reach a desirable and favorable result. The end-means theory suggests that how physical attributes of a product have individual meanings for the users (Lee & Park, 2010). This theory is based on four hypotheses: 1. The objectives and values affect the choice process and play a significant role in choosing and directing the patterns. 2. The individuals can manage the product diversity (various attributes) by classifying them to reduce the complexities and confusion in choice. 3. The user's behavior has a consequence, and these consequences are not the same for everyone. 4. The users learn to link between the behaviors and particular consequences (Meesters, 2009, p. 21).

The end-means model has attracted the attention of housing researchers in the last decade, and as a powerful tool in measuring the mental characteristics of users, considers the meanings desired by people regarding the reason for their preferences (Zinas & Jusan, 2011, p. 79). This model consists of a chain, including three phases of the attribute, consequence, and value (Reynold & Gutman, 1984) (Figure 1). The attribute includes the qualities related to the attributes of an individual or an object, which is defined as the physical or perceptual features of a product selected by the users (Meesters, 2009). The consequence is what follows something and is resulted from it. According to Coolen and Hoekstra, the consequence is the direct or indirect result of a person's activity or behavior that can be desirable or undesirable (Coolen & Hoekstra, 2001). Values form the most abstract level of the chain. They are the existing interests in the most final form of the product determined based on the individuals'

preferences and priorities and have strong perceptual results, such as a sense of security, happiness, pleasure, and joy (Vriens & Hosfstede, 2000). The direction of the individuals' activities is affected by the values.

However, the values are not the same in terms of significance, and people prioritize the values when they are in the situation to choose among various options.
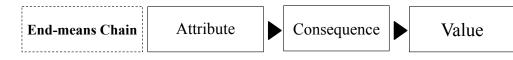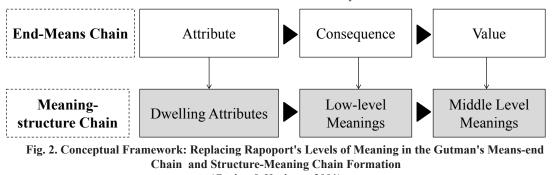
| End-means Chain | Attribute | ▶ | Consequence | ▶ | Value |

Fig. 1. The Conceptual Structure of the End-Means Model
(Gutman, 1982)

The means-end chain has a bottom-up approach in the housing studies, the beginning point of which is the physical attributes of the housing[2]. In this process, the audience can choose one of the attributes of the house and then respond to the interviewer that what does it mean for him/her? (Reynold & Gutman, 1988). This method is called the laddering technique. Using the in-depth interview technique, the researchers obtain information on the latent purposes in people's choice and their cognitive structure (Meesters, 2009, p. 22). Three levels of meaning, including objective and tangible meanings at the attribute level and objective and subjective meanings at the level of consequences and personal values, can be recognized using the semi-structured laddering technique.

3. CONCEPTUAL FRAMEWORK OF RESEARCH

The current study addressed the relationship between the low-income cultural residents and the attributes of the interior space of the housing and considered the meanings that people attributed to those features. The methodological and conceptual framework suggested by Coolen (2002) known as "meaning structure' was used to achieve the different levels of meaning. "Meaning structure" is the developed model of End-means model of Gutman (1982) by replacing the levels of meaning of Rapoport (1988), including a set of meanings related to the considered behavior (people's activities in the housing" and attributes (housing attributes) and associates the housing attributes to the share of that attribute to realize the objectives and values. In this method, each

attribute has a consequence, and the significance of each consequence depends on its ability to meet the purposes and people's values. The meaning structure method was first suggested by Coolen and Hoekstra as a qualitative and non-computational method in housing studies (2002), and the was considered by Coolen (2006, 2008) to measure the meaning of house. To provide a conceptual and methodological framework for studying the "meaning of priorities for housing attributes", Coolen conducted extensive studies in this field. According to him, the study of "housing attributes " is very practical in achieving the values that people pursue, and the meaning of housing attributes lies in this practical relationship. The studies of Coolen (2008) indicated that the end-means model needed to be modified at least in some parts. According to this model, each outcome must have an intrinsic value. However, according to Coolen's research, a precise definition of the consequence and values of individuals was not true in all cases. To address this shortcoming, he suggested that the idea of a more precisely defined classification would make the end-means model more flexible and efficient. Coolen and Hoekstra, considering that the classification of Rapoport's levels of meaning has not been used effectively in previous studies (Coolen & Hoekstra, 2001), by substituting semantic levels - according to which meaning is the main mechanism of the relationship between the individual and the environment - Instead of consequence and value classifications, they improved the efficiency and flexibility of their model, thus examining not only the functional meanings of housing attributes but also the reason for the attribution of those meanings to the characters by residents.

| End-Means Chain | Attribute | ▶ | Consequence | ▶ | Value |
| Meaning-structure Chain | Dwelling Attributes | ▶ | Low-level Meanings | ▶ | Middle Level Meanings |

Fig. 2. Conceptual Framework: Replacing Rapoport's Levels of Meaning in the Gutman's Means-end Chain and Structure-Meaning Chain Formation
(Coolen & Hoekstra, 2001)

The conceptual framework of the current research was presented in Figure 2 based on Rapoport's (1988)

levels of meaning and Gutman's (1982) means-end chain. This framework consists of a set of housing

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attributes, the low-level and daily meanings (manifest function) and middle-level meanings (latent function) related to those attributes, and they form a chain of "attribute-manifest function- latent function" of the meaning structure within in (Coolen, 2006; 2008).

4. METHODOLOGY

In the present study, due to the nature of the problem related to exploring the aspects of phenomena and meanings governing housing attributes, the meaning structure method as a qualitative research approach (Charmaz, 2006) was used by various data collection techniques such as environmental photography, field observation, and measurement and analysis techniques of the structure-meaning method (Coolen, 2008), i.e., semi-structured laddering technique.

4.1. Study Area

The case study was a 168-unit housing project of Andisheh (Pileh Sohran) located in the southeast of Ardabil. The average floor area of residential units is 75 square meters, 80% of which are two-bedroom, and 20% are one-bedroom. In approaching individuals

to interview, individuals who have a family and have more social interactions and responsibilities for their home and family were selected because they are more likely to be more sensitive to the qualities of the environment. Interviewees were randomly selected from men and women with an average age of 35 years. To ensure that the necessary information was received, the concept of "theoretical saturation" determined the number of samples, interviews, observations, and data collection, and data collection continued until the data was repetitive and no new data was received. Under these conditions, a total of 85 residents were interviewed using the in-depth laddering technique. In some units, both heads of households (male and female) participated in the interview. The interview lasted about twenty to forty minutes for each person and was based on the number of attributes desired by the interviewee. The sampling process continued until the meaning structure chains were repeated. Defective chains that did not end in a specific value and meaning based on the content analysis of the data were removed from the analysis. Based on the interviewees' answers, one to three valuable chains were recorded and analyzed for each respondent.
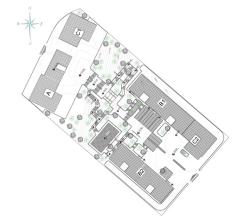

Fig. 3. Plan of the Complex
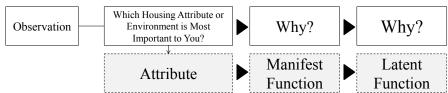
4.2. Data Collection and Analysis

In this study, the measurement and analysis of components of the meaning structure chain (Coolen, 2006; 2008) and the relationship between components were performed in six stages:
1) Extracting housing attributes: At this stage, a list of common attributes of housing interior space is prepared by researchers using the observation method and information from library studies and is provided to respondents on cards (Reynolds, Dethloff, & Westberg, 2001).
2) Selecting attribute: At this stage, respondents select important attributes from the attributes provided on the cards (Coolen, 2006, p. 81). These attributes show the preference and priority of residents in relation to housing attributes. It is possible to add housing attributes that are not on the list and are important to residents at this stage, and respondents are not limited in choosing a specific number of attributes.

To achieve meaningful chains, the housing attributes stated by more than 50% of the respondents are used in the analysis (Coolen, 2007). In the present study, in relation to "housing interior space", five attributes, including residential unit size, number of rooms, living room size, private terrace, and sound insulation of rooms were mentioned more than other attributes by residents.
3) Conducting semi-structured laddering technique and determining the meaning structure chain: The semi-structured laddering technique is the main stage of analysis and measurement of the meaning structure chain. In this stage, the semi-structured in-depth technique, called the semi-structured laddering technique, was used to form the meaning structure chain. This technique includes a direct interview process by raising the question "Why this attribute is important for you" in order to identify the relationship between the main components of the chain, i.e., attribute- manifest function, latent function. "Why?" is

asked from the respondents' about their answers and is repeated until the respondents cannot answer any more questions (Coolen & Hoekstra, 2001, p. 296). The first step of this process begins with the attributes selected by the residents in the previous step. The process of conducting the interview is presented in Figure 4. In the following, the meaning structure chains are determined

based on the interviews. First, the data collected from the interviews were analyzed using content analysis (Krippendorff, 2018), leading to the formation of a set of chains for the respondents. An example of the summary meaning structure chain related to the attributes of the interior space of the housing can be seen in Figure 5.

Fig. 4. The Process of the Semi-Structured Laddering Technique

Fig. 5. An Example of the Summary Meaning Structure Chain of the Attributes of the Interior Space in the Process of the Semi-Structured Laddering Technique

5. Coding the meaning structure chain: In the following, the components of the meaning structure chains were coded in three stages and were divided based on the subject and their level in the chain. In the first step, all data were considered as open coding. This step is an analytical process through which the concepts were identified and developed based on their attributes and aspects. In the second step, the data were coded selectively in the data analysis tables. In this step, the categories obtained from the open coding were separated, and the most relevant categories to the research question were selected among the created codes. In the third step, the analytical data were coded axially to obtain the analytical points for the research conclusion. This step is a brief visual presentation of the process and the subject and must be described in

summary (Corbin &Strauss, 2008; Saldana, 2010). The organized coding of the data in this process leads to comprehensive attention to all data and considering them in the research. When developing code, extensive chains and the formation of ambiguous meanings are avoided. To observe the "validity" of the process of coding the content of the interviews, the recorded content of the interviews is controlled by the authors to create a "theoretical consensus" to ensure the correct measurement of research components in the process of coding interviews. To observe "reliability", the content of the interviews in the two groups is coded in parallel and independently of each other, which due to the similarity of the coding results, ensures the consistency of the results of the interview. The final codes can be seen in Table 2.

Table 2. The Results of Coding the Meaning Structure Chain of the Attributes of the Interior Space

Latent Function	Manifest Function	Housing Attribute
(16) Pleasant Life	(6) More Space	(1) The Size of Residential Unit
(17) Social Relations	(7) Activity	(2) The Number of Rooms
(18) Connection with Nature	(8) Connection with Nature	(3) The Size of the Living Room
(19) Privacy	(9) Private Space	(4) Private Terrace
(20) Independence	(10) Spending Time with Family and Friends	(5) Sound Insulation of the Rooms
	(11) Arrangement and Decoration	
	(12) Comfort and Convenience	
	(13) Working at Home	
	(14) Entertainment	
	(15) Rest/ Taking Rest From Work	

6. Formation of the Hierarchal Value Map (HVM): In this step of the analysis, the coded chains are summed by an implication matrix. An implication matrix is a square matrix that shows the relationship between the components of a chain and indicates the number of times each element interacts with the other elements (Reynolds & Gutman, 1988; Lee & Park, 2010, p. 116). In this matrix, there are two types of relationships between the elements: direct and indirect relationships. In the direct relationship, each element is connected to the other element without the intervener element. In an indirect relationship, two elements are indirectly related to each other through one or more other elements. The final codes are numbered first to form the implication matrix (Table 2). These numbers are used to represent elements in the implication matrix. The numbers in the implication matrix are displayed in decimal 22 (Table 3) so that the number of direct relations is on the left and the number of indirect relations is on the right of the decimal. For example, the size of a residential unit (1) is directly related to private space (9), four times directly and twice indirectly.

Table 3. Implication Matrix of the Attributes of the Interior Space of the Housing

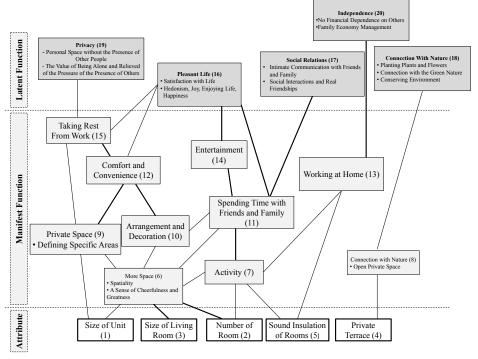|		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Residential Unit	7	0.03		4.02	0.06	0.03	0.04	0.06	0.0.2	0.04	0.06	0.05		0.04	0.03
2	The Number of Rooms	9	7		0.06	0.05	0.06	0.04	0.03	0.02	0.0.4	0.07		0.06	0.05	0.03
3	The Size of the Living Room	12	0.05		0.03	0.05	0.04	0.03	0.03	0.04	0.02	0.8	0.96		0.03	0.05
4	Private Terrace			6										0.06		
5	Sound Insulation of Rooms		6				0.05		6.04	0.04		0.05	0.04			0.06
6	More Space		4		3	5	7	0.04	0.03	2.02	0.04	0.10	0.07		0.06	0.04
7	Activity						11		6	0.03		0.9	0.04			0.06
8	Connection with Nature													9		
9	Private Space							12			6.03	0.07			0.04	
10	Arrangement and Decoration						7	9		0.03	0.04	0.05	0.05		0.04	
11	Spending Time with Friends and Family									9		12.03	13			
12	Comfort and Convenience										10	6.03			0.05	
13	Working at Home														13	
14	Entertainment											10				
15	Taking Rest From Work											7			8	
16	Pleasant Life															
17	Social Relations															
18	Connection with Nature															
19	Privacy															
20	Independence															

Fig. 6. The Hierarchal Value Map of the Attributes of the Interior Space of Housing Based on the Implication Matrix

The Hierarchal Value Map is formed from the data collected in the implication matrix to link all the specific chains in a way that is easy to read and interpret (Reynolds & Gutman, 1988). This map shows all the laddering chains of the respondents in a single map, which refers to the relationships between the elements of "attribute-manifest function-latent function" and the dominant perceptual orientations (Fig. 6).

7. Analysis and interpretation of the Hierarchal Value Map: After implementing the mentioned seven steps, the map of the chains is analyzed, and the meanings governing the attributes of the interior space of the housing are obtained in the sample under study. These results, in accordance with the theoretical framework of the research, express the significant aspects governing the attributes of the interior space of the housing. Therefore, adequate reliability is obtained from the "validity of the final conclusion" and its compliance with the objectives of the research.

5. ANALYTICAL FINDINGS OF THE ATTRIBUTES OF THE INTERIOR SPACE OF THE HOUSING

In the field studies and analytical results of this research in the form of a hierarchical value chain map, the concept of interior space attributes of housing was investigated. According to the results, five attributes related to the interior space are considered important attributes for residents with positive meanings and facilitate the achievement of their values and goals. These attributes are as follows: the size of the residential unit, the number of rooms, the size of the living room, the private terrace, and the sound insulation of the rooms. After reviewing the results of the interviews

and based on the hierarchical value chain diagram, the following points can be presented:
The size of the residential unit: This attribute is directly connected to two consequences "more space" (n = 7) and "private space" (n = 4) and is indirectly related to five consequences "arrangement and decoration", "spending time with family and friends", "comfort and convenience, "entertainment" and "rest from work". This attribute is important for the residents due to the four values (meaning) of "Pleasant life", "social relations", "privacy", and "Independence. These meanings indicate the intentions and objectives that a person has in his/her mind and are reflected in the people's evaluation of the "size of the residential unit", which according to them, facilitates the achievement of those meanings. The hierarchal value map presented in Figure 6 indicates the relationship between the attributes, manifest functions (consequence), and latent functions (meaning). One of the strongest chains is related to the relationship between the size of the residential unit and more space (n=7), spending time with friends and family (n=7), social relations (n=13)/ pleasant lives (n=12). This relationship indicates that the respondents attribute spending time with family members and their friends to the size of the residential unit affected by having more space, and the values "social relations" and "pleasant life", as the important meanings desired by the residents" are met through this. Another chain indicates the relationship between the size of the residential unit-private space (n=4), comfort and convenience (n=12), taking rest from work (n=10), privacy (n=8)/ pleasant life (n=7). This relationship shows that the respondents attribute the convenience and comfort and taking rest from work to the size of the residential unit affected by having

private space for each person through which the privacy is met. Also, according to the hierarchal value map, "taking rest from work without the presence of other people" provides the value of "pleasant life and sense of satisfaction with life" for the residents. The size of the residential unit attribute ensures the value of independence through the chain of unit size- more space (n=7)-working at home (n=6)- independence (n=13), which is one of the most significant concepts for the residents and means no financial dependency and management of the family economy.

The number of rooms: This attribute is directly related to two consequences "more space" and "activity" and is indirectly linked to the "private space" arrangement and decoration", "spending time with family and friends", "convenience and comfort", "working at home", "entertainment", "taking rest from work" consequences. Among these consequences, "more space" (n = 9) and "activity" (n = 7) have the strongest relationship with the attributes of the "number of rooms". The importance of this attribute for the inhabitants is due to four values (meaning) as follows: "pleasant life", "social relations", "privacy" and "independence". One of the strongest chains is associated with the relationship between the number of rooms - the more space (n = 9) - spending time with family members and friends (n = 7) - social relations (n = 13) / pleasant lives (n = 12). This relationship shows that respondents attribute spending time with family members and friends to the number of rooms, and there is a possibility of providing the value of "social relations" and "pleasant life" in this way. The chain of Number of rooms - Activity (n = 7) - spending time with family members and friends (n = 11) - Social relations (n = 13) / pleasant life (n = 12) emphasizes the importance of two values of "pleasant life", "Social relations" ensured by the consequence of "activity". Chain of room-activity (n = 7) - working at home (n = 7) - independence (n = 11) is another strong chain in the chart. Based on this chain, residents attribute the consequences of working at home to the number of rooms, under the influence of the consequence of activity, and the value of "independence" is ensured by this relationship. Also, the number of rooms attribute is related to privacy according to the number of rooms - more space-private space/comfort and convenience/ resting from work/arrangement and decoration. It indicates that the considered attribute provides the "privacy" value for residents due to the consequences. It seems that regarding this attribute, the values of "pleasant life" (n = 7) and "social relations" (n = 5) are the most important meanings desired by residents that are provided through their (direct and indirect) consequences.

The size of living room: This attribute is directly related to "more space" consequence and is indirectly associated with "activity", "private space", "arrangement and decoration", "spending time with family members and friends", "convenience and comfort", "working at home", "entertainment",

"resting from work" consequences. The significance of this attribute for the residents is due to "pleasant life", "social relations", "privacy", and "independence" values. Similar to the attributes of the size of the residential unit and number of the room, this attribute has the highest direct relationship with more space consequence (n=12), and is related to the meanings desired by residents through the following chains:

-size of the living room- more space (n=12)-spending time with family members and friends (n=7)-social relations (n=13)/ pleasant life (n=12)

-size of the living room-more space (n=8)-arrangement and decoration (n=5)- comfort and convenience (n=9)-taking rest from work (n=10)- privacy (n=8)/ pleasant life (n=7)

-size of the living room- more space (n=8)-activity (n=4)- working at home (n=6)-independence (n=13) Among the stated values, "pleasant life" and "social relations" are the most significant meanings desired by the residents provided through (direct and indirect) the size of the living room attribute.

Private terrace: This attribute is directly related to the "connection with nature" consequences. The significance of this attribute for the residents is due to the "connection with nature" value. The chain of private terrace- connection with nature (n=6)- link with nature (n=9) is the key connecting chain in this attribute. According to this chain, the inhabitants of the relationship with green nature depend on having a private open space, and the value of "link with nature" is met in this way.

Sound insulation of the rooms: This attribute is directly related to "activity" and "working at home" consequences and is indirectly connected to the "spending time with family members and friends" and "entertainment" consequences. The significance of this attribute for the residents is due to "pleasant life", "social relations", and "independence" values. This attribute is related to the meanings desired by the residents through the following chains:

-sound insulation of rooms- activity (n=6)- spending time with family members and friends (n=11)- social relations (n=13)/ pleasant life (n=12)

-sound insulation of rooms- activity (n=6)- working at home (n=6)- independence (n=11)

-sound insulation of rooms- working at home (n=6)- independence (n=11)

The relationship between the chains indicates that the respondents attribute the social relations and pleasant life to the sound insulation of rooms regarding the interior space of housing through the consequence of spending time with friends and family members. Also, the stated attribute provides the independence value for the residents through working at home. According to the hierarchal value map and implication matrix, the most significant attributes of the interior space of housing were identified based on residents' opinions, and the latent and manifest functions related to these attributes were studied, thus determining the "relationship between the elements of the meaning

structure chain, which is one of the main objectives of the current research. Table 4 shows the frequency of the latent values and meanings resulted from the in-depth laddering technique. According to this table, pleasant life (n=80), social relations (n=50), independence (n=42), privacy (n=39), and link with the nature (n=15) have the maximum frequency, respectively. The findings show that these meanings are responded through housing attributes and their consequences. Similarly, the value of "pleasant life" and "social relations" can be provided for residents influenced by the attributes of the size of the residential unit, the number of rooms, the size of the living room, the sound insulation of the rooms, and the consequences of them. Also, the value of "independence" can be ensured through the attributes of the number of rooms and the sound insulation of the rooms. The value of "privacy" can be provided through the attributes of the residential unit size, the number of rooms, the size of living room, and the value of "link with nature" can be met through the attributes of the private terrace and the consequences of this attribute.

Table 4. The Frequency of the Values Resulted From the In-Depth Laddering Interview Based on Table 3 (The Number of Times that Values Were Stated by Interviewees)

Value	Frequency
Pleasant Life	81
Social Relations	50
Link With Nature	15
Privacy	39
Independence	40

Fig. 7. Pleasant Life Value, Its Attributes, and Related Consequences

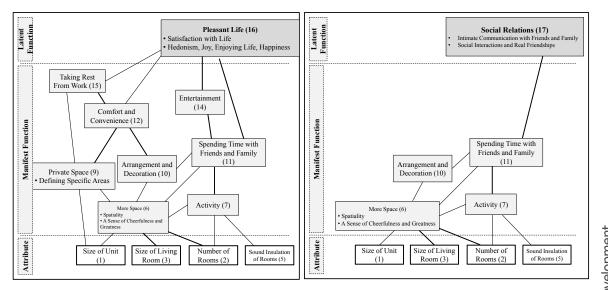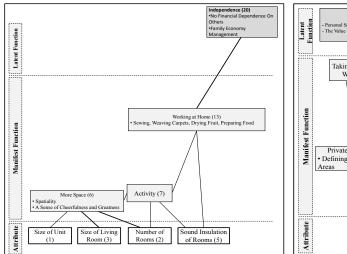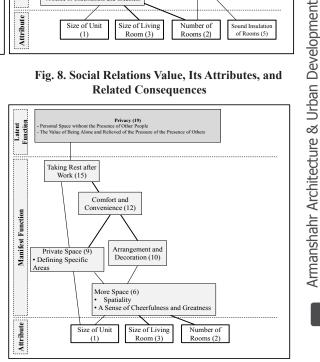**Fig. 8. Social Relations Value, Its Attributes, and Related Consequences**

Fig. 9. Independence Value, Its Attributes, and Related Consequences

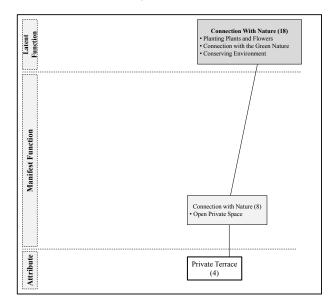**Fig. 10. Privacy Value, Its Attributes, and Related Consequences**

Fig. 11. Link with Nature Value, Its Attributes, and Related Consequences

6. CONCLUSION ART

The current study investigated the meaning structure of the attributes of the interior space of housing for low-income groups residing in Andisheh Mehr Housing, Ardebil, based on the conceptual framework suggested by Coolen (2006), in which the meaning of housing lies in a functional relationship between the housing attributes, in the one hand, and the individual's objectives and values, on the other hand, and using the End-means theory of Gutman (1982) and levels of meaning of Rapoport (1988), as the theoretical foundations. In the conceptual framework, the manifest functions (daily and low-level meanings) of housing attributes were investigated by classifying the consequences and latent functions (middle-level meanings) by grouping the values. The interactive relationship between the consequences (latent functions) and values (latent functions) in five attributes desired by the residents was presented in the hierarchal value map, including the size of the residential unit, the number of rooms, the size of the living room, the sound insulation of the rooms, and private terrace. The way to meet the values and latent meanings desired by the residents was identified and the housing attributes and their resulted consequences were recognized regarding the considered value in the study of the relationship between these elements. Investigating the hierarchal value map and the propositions of attribute-manifest function- latent function in the analytical findings of Andisheh Mehr Housing indicated that the cultural meanings are influential in the housing attributes of the low-income group through a specific consequence. According to the experimental results, the most significant meanings and influential values in the attributes of the interior space of the housing are pleasant life and social relations that considerably affect the physical attributes, including the size of the residential unit, the number of rooms, the size of the living room, terrace, and sound insulation of the room. "Independence" value can be ensured by the attributes of "the number of rooms" and "the sound insulation of rooms", and "privacy" can be met through the attributes of the size of the residential unit, the number of rooms, and the size of the living room. "Connection to nature" also is significant due to its influential consequences on the housing attributes to meet the needs for the independent open space and can be ensured by the private terrace and the consequences of this attribute. These meanings resulted from the observations, and the research interviews are the values and subjective values of the low-income groups residing in the Andisheh Mehr housing that can be influential in the formation of the low-income groups' housing attributes. According to the findings, the attributes of the interior space of the housing are meaningful for residents, and they emphasize the cultural values governing each attribute. Therefore, to answer the first and second questions of the research, it can be said that the attributes of the interior space of the housing for the low-income group in the studied area have meaningful features and include the meanings of a pleasant life, social relations, independence, privacy, and connection with nature.
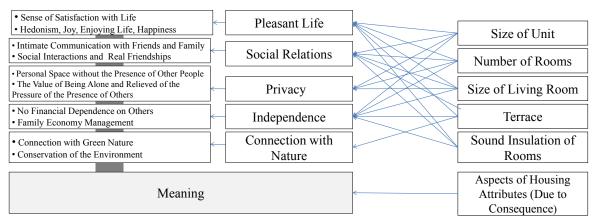
Fig. 12. Attribute-Latent Function Governing the Housing Attributes of the Andisheh Mehr Housing

The methodology of this research helps to understand the attributes of the interior space of the housing and explore its meaningful aspects for application in design, in such a way that, by creating specific attributes in the housing environment, the subjective meanings of users can be ensured. In this research, selecting a suitable research environment was important. The low-income group is the most sensitive and most important part of the planning of economic and social development, which requires attention and study quantitatively and qualitatively. The structure of the policies and housing design plans for low-income groups must define, identify and understand housing of these areas, their attributes in cultural dimensions, especially the meaning of a built environment. The Mehr Housing is comprehensively implemented in most cities in Iran or is being implemented. The comprehensiveness of this project and the high number of its target groups indicates the sensitivity and importance of the subject of this study. The study of the meaning of housing attributes for the low-income group living in Mehr housing as the most important aspect of the housing quality, reveals the latent aspects of the attributes desired by residents, and the meanings governing them. The meaning structure of housing attributes is a semantic representation that is perceived by the individual. In general, since the values and subjective meanings of individuals differ in different cultural groups, it seems that by examining the group of specific people with the same level of life, common and significant aspects can be provided to study the human-environment relationship that is different from other cultural groups. It is suggested that in future research, using the conceptual framework provided, the meaning of housing attributes for different cultural groups is investigated and compared with the results of this study. By comparing these meanings, it is possible to achieve important results in the areas of subjective meanings of the residents and improve decision-making, planning, and design for different cultural groups within the framework of the results.

END NOTE

1. In the past decade, the ecological approach as housing has been considered by many researchers. This approach, which is one of the important theories in behavior in the environment, emphasizes the persistent interactions of the individual with the meaningful attributes of the environment and considers the intentions of human activities, and instead of studying behavior experimentally, pays attention to the behavior of the individual in the everyday life environment (Coolen 2007, p. 2).

2. A simple example of this model can be as follows: five rooms (attribute)- more space (consequence)- privacy (value).

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