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A Delphi-Based Assessment of Interior Spatial Features of Apartment Houses; A Case Study of North Golshahr and Nazarabad Neighborhoods of Bandar Abbas City*

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ABSTRACT

The interior features of apartments markedly influence the satisfaction of residents and the quality of living. The present research evaluated and compared the importance and fulfillment of interior spatial features of apartment houses in North Golshahr and Nazarabad neighborhoods in Bandar Abbas. This was Delphi-based fundamental research targeting house designers and ten experts with 20 to 40 years of experience living in Bandar Abbas. Data were collected from library studies and field observations of the intended neighborhoods. Theoretically, the library reviews revealed 28 spatial features which were then classified into "structural-functional" and "qualitative-psychological" categories. Next, the experts were provided with Likert-based questionnaires to evaluate and classify the importance and fulfillment of spatial features in the studied apartment houses. Although the proposed classification was approved by the experts, some spatial features did not conform with the apartment houses in Bandar Abbas and, hence, were deleted, modified, or merged and declined to 16 items in the first round of the Delphi assessment. These were spatial guidance and orientation, spatial opening, spatial composition, proportion of space, spaciousness, spatial hierarchy, spatial relations, spatial dynamics, spatial coziness, harmony and balance, spatial separation, spatial flexibility, spatial diversity, spatial differentiation, spatial integration, and space nostalgia. For the studied neighborhoods, the importance of each spatial feature was currently higher than their fulfillment, implying that the key spatial features are lacking in the interior design of apartment houses in Bandar Abbas.

Keywords: Spatial Features, Apartment Houses, Delphi Method, Evaluation, Bandar Abbas.

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1. INTRODUCTION

Housing has multiple features, including architectural and environmental features, access to services, etc. A key aspect reflected by housing applicants when choosing a house is to make the maximum use of these features (Vivan et al. 2019). Indeed, all of these features are reflected by the households when choosing satisfactory housing (Liang et al. 2018, 1). Simply put, households make optimal choices by trading off between diverse features (Chen et al. 2008). The environmental quality of living houses is a key aspect for home buyers before purchase, and this feature has a marked effect on the housing price (Teck-Hong 2011, 59). Importantly, decision-makers must realize and analyze the spatial features of housing and their significance for households (Gehrke et al. 2018). Accordingly, all the housing features, particularly spatial ones, must be strictly reflected in the housing designs. For a housing project to excel, the designers shall reflect on spatial features and assess the impact of these features on housing quality. As such, it is pivotal to conduct relevant research to identify and investigate the spatial features of the house.

In current Iran's housing planning, the mere plunge in quantitative aspects has shifted standards toward numerical criteria, and even with a marked attention to housing, the predominant measure is to supply the demand per capita. This is while the Iranian housing policies need to cover qualitative dimensions of residence (e.g., spatial features) and reflect how such spatial features are included in the apartment housing designs. A central step in housing studies is to identify and evaluate the qualitative features of the housing interior space, and the findings apply to the design of residential spaces. The present research investigates the interior architectural features of apartment houses. Specifically, the research questions are 1) what are the interior spatial features of apartment houses, 2) how such interior spatial features are assessed using the Delphi method, and 3) to what extent the key interior spatial features have been realized in apartment houses in Bandar Abbas.

2. LITERATURE REVIEW

Housing is a fundamental place and space for living (Deng 2019) and is correlated with human needs at varying levels. Housing is a key social commodity and pivotally contributes to identity formation and social relationships and goals (Short 2014). Accordingly, it is crucial to investigate the concept of space in house architecture.

Kurt Grütter (2019) defines space as a place where an object can be placed or can be occupied with something. Further, every space has an inherent capacity (Thoring et al. 2018, 64), and as such, Aristotle compares space with a container. Indeed, Aristotle ponders space to be an empty, and essentially enclosed, place, and accordingly, every space is spatially bounded (Kurt Grütter 2019). Von Meiss (2013) defines the concept of space between objects. According to him, an architectural space originates from the relations between objects or boundaries. Notably, such boundaries can be roughly visible, form continuous surfaces, and create an interrupted or uninterrupted border.

In a space-oriented approach to architecture, Memarian (2014) reflects space as a key to perceiving architecture. By articulating the theory of spatial perception and spotlighting the environmental perception of architectural space, they reflect that contemporary Iranian spatial architecture needs to be researched concerning spatial features. Elsewhere, Haeri (2015) depicts the dynamics of Iranian architecture regarding spatial features.

Most of the current problems with architectural housing emanate from controversial clarifications and concepts delivered by space designers. The overall concept of space causes diverse synonym parts to be used in differing ways. Indeed, space concept and meaning are not furnished after space design and formation and, instead, are strongly correlated with the process of space formation (Tabatabaei Malazi, Malakavarzamani, and Sabernejad 2020, 61). Accordingly, diverse interpretations and concepts of space and its features need to be crucially differentiated.

By definition, space is known by its elements and features. These include spatial stability (Haeri Mazandarani 2015), openness and playfulness, guidance, and achievement (Ibid, 187), flexibility (Einifar 2003), void (Kurt Grütter 2019), interference, intersection, neighborhood (Ibid), conflict (Ibid), harmony and balance (Ibid), scale and proportion (Ibid), hierarchy (Ibid), dynamics and rhythm (Ibid), transparency, overlapping, eclectic, entanglement (Norberg Schulz 1988), order and disorder (Von Meiss 2013), gradation (Ibid), complexity (Ibid), contradiction (Ibid), and symmetry (Ibid). Elsewhere, Bokharai (2015) points out spaciousness, sequences of spaces, and aspects of spaciousness. Likewise, Alexander (2002) reports structural features of architecture.

Flexibility correlates with the diversity of the residents' demands with time, as the space of houses during their useful life needs to adapt to the varying demands of the residents. Flexibility is defined as diversity, adaptability, and variability, where variability is the ability to change. Versatility is the ability to be used in various spaces and times. Adaptability is the ability to adapt and modify for new resident conditions (Einifar 2003).

Spatial features are further correlated with the concepts of space organization, which, besides empowering space and merging and differentiating spaces, is crucial in the architectural structure of Iranian houses (Haeri Mazandarani 2015). Space

organization covers the technique employed to introduce, merge, and differentiate spaces in houses (Ibid, 19). In Iranian houses, space organization is formed within a spatial network (Ibid, 141-142). According to Haeri, spatial features (e.g., perspective, optical, and spatial expansion) are key elements in the spatial organization of Iranian houses.

According to the literature review of studies conducted in Iran and worldwide regarding the definitions of housing and space, there is no research so far evaluating the spatial features of apartment houses concerning architectural designs. At the same time, the spatial concepts reported by the researchers are partially controversial and limitedly overlapped, implying a detailed clarification and evaluation of these features.

3. RESEARCH METHODOLOGY

This was a fundamental research based on a qualitative-quantitative merged design. The required data were gathered through library sources (i.e., books, articles, and theses) and field observations (I.e., interviews and questionnaires). The research process involved compiling theoretical foundations and the Delphi method, as well as devising questionnaires and data analysis by statistical methods to evaluate interior spatial features of apartment houses.

The experts were provided with questionnaires to identify the importance of each of the spatial features of apartment houses. As such, all the spatial features extracted from research theoretical foundations were investigated through items defined in questionnaires. The Delphi-based questionnaire was designed by defining relevant items scored based on a Likert scale. The items covered the presence, absence, importance, and fulfillment of each of the spatial features of spatial features in the houses of North Golshahr and Nazarabad neighborhoods in Bandar Abbas.

The Delphi method is a systematic and interactive forecasting technique that works based on the opinions of a panel of independent experts (Hafez Nia 2016). The present research gathered the opinions of housing designers and researchers who were particularly active in Bandar Abbas and were acquainted with the demands of residents of apartment houses in this city. For the Delphi section, the sample size was 6 to 12 participants (Habibi and others 2014). The accuracy of measurements was confirmed by 10 specialists, with their information provided in Table 1. The experts had 20 to 40 years of experience in research and housing design in Bandar Abbas city.

Table 1: Profiles of Research Experts in Delphi Questionnaires

No.	Professional Field and Job Position	In-Person	Virtual	Organizational Affiliation	History of Designing Houses in Bandar Abbas (Years)
1	Architecture/ Faculty Member	-	*	Bandar Abbas Islamic Azad University	Over 25/ and Consulting Engineers
2	Architecture/ Faculty Member	*	-	Bandar Abbas Islamic Azad University	Over 20/ and Consulting Engineers
3	Architecture/ Faculty Member	*	-	Roodan Islamic Azad University	Over 20/ and Consulting Engineers
4	Architecture/ Faculty Member	*	-	Hormozgan Vocational/ Polytechnic University	Over 20
5	Architecture/University Lecturer/Consulting Engineers	-	*	Consulting Engineers	Over 40/ and 30 years of experience in housing planning in General Department of Housing and Urban Development
6	Architecture/University Lecturer/Consulting Engineers	-	*	Consulting Engineers	Over 30
7	Architecture/University Lecturer/Consulting Engineers	-	*	Consulting Engineers	Over 30
8	Architecture/ Faculty Member	-	*	Sama Islamic Azad University	Over 25
9	Architecture/University Lecturer/Consulting Engineers	*	-	Consulting Engineers	Over 25/ and Consulting Engineers
10	Architecture/University Lecturer/Consulting Engineers	-	*	Consulting Engineers	Over 25/ and Consulting Engineers

North Golshahr and Nazarabad neighborhoods with a satisfactory history and density of apartment living were chosen for this research. The reasons for choosing these neighborhoods were apartment houses dominating residential spaces and a deep history of living in such houses. As with the experiences of experts in design, the importance and fulfillment of the interior spatial features of apartment houses in these neighborhoods were investigated. Apartment units (i.e., the interior space of the apartment house) were defined as the spatial territory of the research.

Fig. 1. Apartment Houses in North Golshahr (two Right Insets) and Nazarabad (two Left Insets) Neighborhoods in Bandar Abbas

4. THEORETICAL FOUNDATIONS

In this section, the spatial features of apartment houses are defined based on the literature review. Each proposed spatial feature is identified according to the theorists. Table 2 tabulates 28 identified spatial features.

Table 2: Spatial features extracted from the literature

No.	Spatial Feature	Definition
1	Flexibility Versatility	Flexibility (Kurt Grütter 2019) refers to the ability to be changed to achieve new functions. Overall, flexibility covers versatility, adaptability, and variability. Versatility is the ability to use space in variable ways, and diversity correlates to space and time. The space of each residential unit can be coincidently used for multiple functions, or used for diverse functions at different times (Einifar 2003).
2	Flexibility Adaptability	Adaptability refers to the ability of new inhabitants to adapt to new circumstances and situations, often via change, as well as their power to be modified for use in differing and alternating circumstances (Einifar 2003).
3	Flexibility Variability	Variability refers to the flexibility of altering (i.e., downsizing or expanding) the area (i.e., the house) and returning it to the original plan. Flexibility is a response to the growing and variable demands of households over time (Einifar 2003).
4	Spatial Hierarchy	Hierarchy is a key facet in architecture, and it is undeniably vital in living space(s). Hierarchy refers to the link between the components of a whole (Kurt Grütter 2019).
5	Spatial Relations	The most basic feature of buildings is to organize space into relational systems (Hillier and Hanson 1984). By definition, spatial relations can cover four domains: 1) surrounding space, 2) spatial interference or intersection, 3) spatial vicinity, and 4) spatial communication (Kurt Grütter 2019), as well as borders (Alexander 2002).
6	Surrounding Space	Overall, a bigger space can surround a smaller space, while ensuring that the continuity of perspective and space is secured between the two spaces (Kurt Grütter 2019); Also see overlap (Norberg Schulz 1988).
7	Interference or Intersection	The second domain is intersection or interference. While these two hold shared parts, they are independent from each side of the space. Interference is either horizontal or vertical (Kurt Grütter 2019; Ching 2014). See, also, entanglement (Norberg Schulz 1988).
8	Vicinity	The third domain defining the link between two spaces is the vicinity. Vicinity is a prevalent spatial relationship and affords the space a particular definition and scope. The extent of perspective and spatial continuity between two adjacent spaces depends on how much they are separated and/or merged (Kurt Grütter 2019).
9	Communication Space	The fourth domain defining the link between two spaces is achieved through a third space. That is, two spaces are not directly linked and their communication is mediated by the third space with lower or higher importance than those two spaces (Kurt Grütter, 2019). See, also, interstitial space (Haeri Mazandarani 2015) and void space (Alexander 2002; Kurt Grütter 2019).
10	Spatial Guidance and Orientation	Spatial organization defines both orientation and movement. The path of movement and direction is recognized by predicting privacy and non-interference in the privacy of other spaces (Haeri Mazandarani 2015).

No.	Spatial Feature	Definition
11	Spatial Integration	Spatial integration appears in "visual integration", "structural integration", and "structural-visual integration". "Visual integration" or transparency refers to the expansion of visual links of spaces by omitting partitions and walls (Golestani et al. 2018). See, also, transparency (Norberg Schulz 1988; Memarian 2014).
12	Spatial Separation	In the Iranian house architecture, spatial separation happens when residents go through the hierarchy and enter the private arena from either the public arena or the semi-public/semi-private arena. Such a gradual process of entering each space builds privacy (Zanganeh et al. 2019).
13	Spatial Composition	Spatial composition is determined by the way the spaces are placed together. Examples are forming a larger space from several small spaces, a more spatial capacity of a small space through the landscape and light, and actions that enable each space to further link with other spaces while functioning separately (Haeri Mazandarani 2015).
14	Spatial Expansion	Interspaces are between spaces. Indeed, such an interspace is between two spaces with can act separately or together (Haeri Mazandarani 2015).
15	Spatial Optical Expansion	Light and perspective expand the space and alter spatial quality. Spatial expansion and perspective are features of space composition (Haeri Mazandarani 2015). See, also, transparency (Norberg Schulz 1988; Memarian 2014).
16	Spatial Visional Expansion	Light and perspective expand the space and alter spatial quality. Spatial expansion and perspective are features of space composition (Haeri Mazandarani 2015). See, also, transparency (Norberg Schulz 1988; Memarian 2014).
17	Spaciousness	Regarding spatial capacity, spaciousness creates a mentality that is distinctive of reality. Simply put, a space is more spacious when it appears wider. This feature directly correlates with the desirability of space. Research into this area aims to clarify how to attain a more spacious perception of a certain volume of space (Bokharaee 2015).
18	Spatial Differentiation	Every space can be differentiated, and space variety and definition are effective in characterizing and differentiating that space. Architectural elements (e.g., color, materials, height variability, full and empty bodies, and the way of using light) result in diverse spatial experiences (Haeri Mazandarani 2015). See, also, certain space (Alexander 2002).
19	Spatial Opening	Spatial opening appears in diverse types. Examples are closed and semi-open spaces, the quality of spatial expansion, non-bordered spaces, and the presence of spaces with high ceilings (Haeri Mazandarani 2015). "Enjoyable space" in contrast to "boring space" refers to the emotional capability of space (Dashti 2022). See, also, spatial opening (Memarian 2014).
20	Spatial Dynamics	Spatial dynamics is a spatial feature that follows a set or a part of diverse solutions to deliver a dynamic and active sensation inside the house. Solutions are the dynamics of passing and entering, benefiting from the spatial organization of the house regarding wind direction and sunlight and the order of the seasons, perceiving the landscape and seeing nature through the windows (Haeri Mazandarani 2015). See, also, (Kurt Grütter 2019), spatial fluidity (Memarian 2014), space ceylon (Ibid)., and intermittent replication and replication in living structures (Alexander 2002).
21	Spatial Greatness	The sense of greatness and wonder refers to the presence of large spaces blended with small spaces, bright spaces blended with dimly lit spaces, tall closed and covered spaces blended with smaller spaces, and well-arranged spaces blended with simple spaces, as well as receiving natural light from the ceiling and decorations in the spaces (Haeri Mazandarani 2015).
22	Spatial Diversity	The spatial organization of historical houses delivers diverse experiences and activities. Further, it provides a spatial diversity that results in enhanced and expanded aspects of each activity (Haeri Mazandarani 2015).
23	Spatial Coziness	The term "coziness" is reported in the interviews as "warm and comfortable space" in contrast to "cold and soulless space", "intimate space" in contrast to "luxurious and artificial space", and "cozy space" in contrast to "crowded and awkward space". In the Oxford dictionary, "coziness" is reported as "cozy" or "cozy", meaning small, comfortable, and warm space (Dashti 2022). See, also, simplicity and inner peace (Alexander 2002).
24	Space Nostalgia	The term "nostalgia" refers to the quality of space, and appears in words such as "familiar space" in contrast to "strange space", and "nostalgic space" in contrast to "memoryless space". The term "memorable" is synonymous with the term "nostalgic", and "nostalgia" refers to the feeling of the audience in sensing a space with its past color and smell and the psychological tendency of the audience to return to its past enjoyable circumstances (Dashti 2022).
25	Privacy	The balance between privacy and social interaction is a vital psychological demand of the residents of apartment units. The concepts "solitude", "privacy", "personal space", and "human distance" are all interconnected. These concepts originate diverse forms of spatial relations in the residential unit's spatial organization and in various cultures (Habibzadeh Omran et al. 2022).
26	Harmony and Balance	Harmony is a base of architectural aesthetic foundations and is not restricted to the architectural space. Indeed, all materials, colors, objects, designs, etc. need to be consistent and follow a superior and inclusive order (Kurt Grütter 2019).

No.	Spatial feature	Definition
27	Proportion of Space	Proportion is a determinant of harmony and has constantly been a subject of interest in architecture. Proportion is a subjective value and is merely investigated regarding the shape. In architecture, proportion refers to a ratio that expresses the link between two or more sizes (Kurt Grütter 2019).
28	Scale of Space	An appropriate spatial scale is vital in all daily life events. Diverse scales and bounded surfaces in a space deliver a deeper understanding of the surfaces (Alexander 2002).

According to Table 2, the spatial features are categorized into "structural-functional spatial features" (concentrating on functioning-impacted features) and "qualitative-psychological spatial features" affected by the space's qualitative aspects. As such, the "structural-functional spatial features" have a functional nature, such as flexible spatial features. Similarly, the "qualitative-psychological spatial features" correlate with the psychological and emotional domains, such as spaciousness. These two categories have been confirmed in previous studies.
According to the theoretical findings, each identified spatial feature was included in the proposed categories and assessed in both categories using the Delphi questionnaire. The first category (i.e., structural-functional spatial features" was selected based on functioning-impacted features, and the second category (i.e., qualitative-psychological spatial features) was selected based on the space's qualitative aspects. Further, both categories were investigated by the Delphi technique to confirm that each feature is included in the right category.

5. RESEARCH FINDINGS

Theoretically, 28 spatial features were presented to the experts to assess the inclusion of these features of apartment houses in North Golshahr and Nazarabad neighborhoods using the Delphi questionnaire Figure 2 demonstrates ultimate spatial features confirmed using the Delphi method. Besides assessments by the experts, the spatial features and their definitions were investigated through field observations with the residents of the houses to ensure the validity of items and research methodology, and the correctness and perception of the features from the perspective of the residents. As given in Table 1 based on the second round of the Delphi method and evaluations by the experts, the spatial features in Bandar Abbas are 16 items. The aim of questioning the residents was to verify the concepts, and the purpose of questioning the experts was to ensure the correctness or incorrectness of the "missed" concepts.

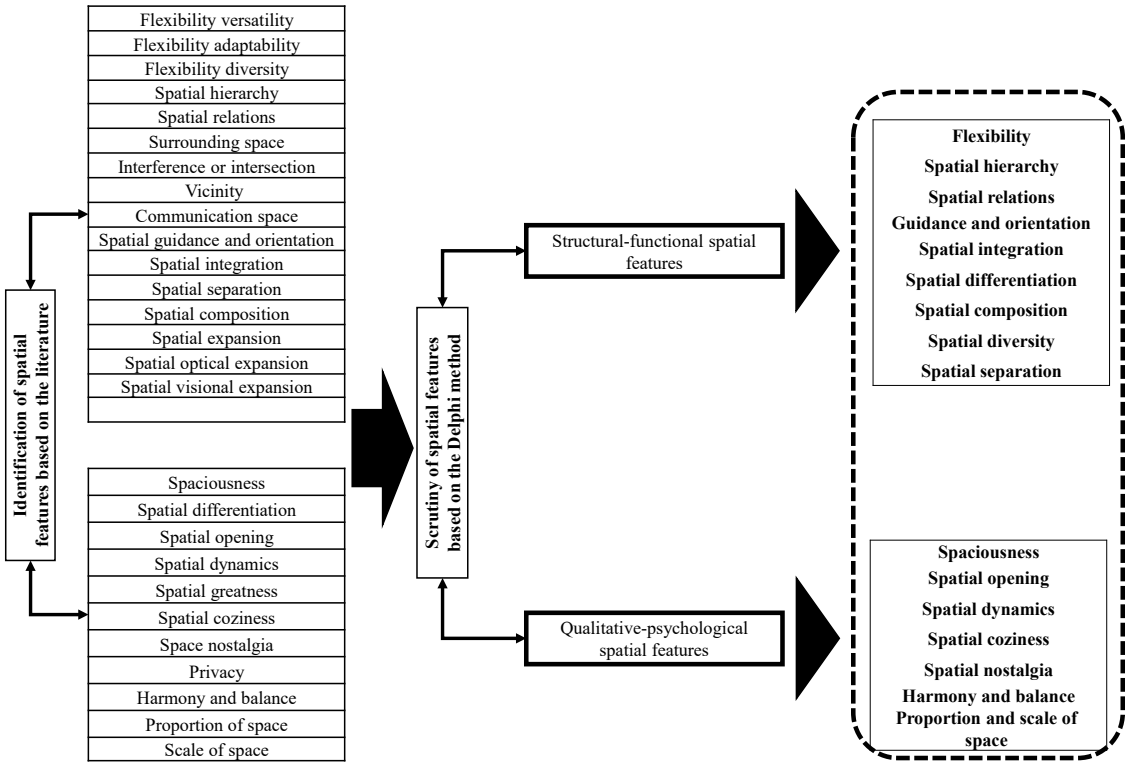


Fig. 2. Scrutiny of Interior Spatial Features of Apartment Houses in Bandar Abbas Neighborhoods using the Delphi Method

According to experts, some spatial features did not conform with the apartment houses in Bandar Abbas and, hence, were deleted, modified, or merged and declined to 16 items in the first round of the Delphi questionnaire. These were spatial guidance and orientation, spatial opening, spatial composition, proportion of space, spaciousness, spatial hierarchy, spatial relations, spatial dynamics, spatial coziness, harmony and balance, spatial separation, spatial flexibility, spatial diversity, spatial differentiation, spatial integration, and space nostalgia.

The category of "solitude and privacy" was omitted during Delphi assessments because of its meaning orders. Indeed, according to experts, spatial relations and spatial separation are influenced by "solitude and privacy".

The category of "spatial expansion" overlapped with the category of "intermediate spatial relationship", and therefore was omitted.

The category of "optical expansion" overlapped with the categories of "spaciousness" and "spatial opening", and therefore was omitted.

As with the Delphi results, the category of "visual expansion" overlapped with the categories of "spatial integration, spaciousness, and spatial openness", and therefore was omitted.

The sub-categories of "spatial integration" overlapped with the categories of "spatial relations" and "spatial opening". Thus, the category of "visual integration or transparency" was preserved.

The category of "spatial relations" was removed, as its general concept has been repeated in the next few subcategories.

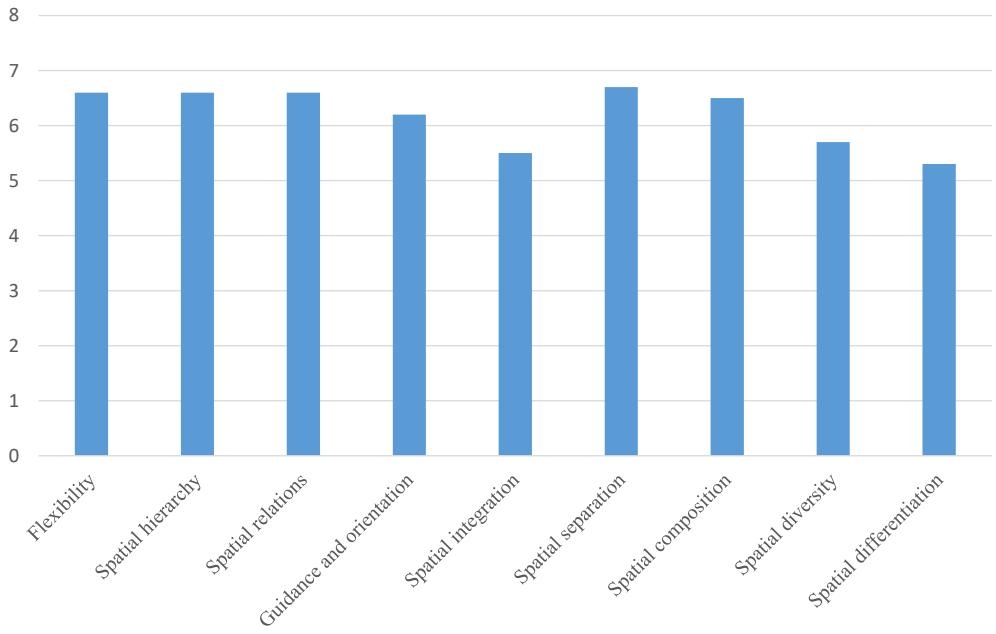
Based on the Delphi method, the category of "surrounding space" did not apply to the studied residential units.

The category of "interference or intersection" overlapped with the category of "spatial composition", and therefore was omitted.

The sub-categories of "flexibility" were labeled with the sub-categories of "diversity", "adaptability", and "variability".

According to the results of the Delphi method, the sub-categories of "spatial diversity" were rewritten with particular definitions.

As shown in Figure 3, the categories of "structural-functional" and "qualitative-psychological" features proposed by experts are scored and confirmed. Similarly, the importance of each of the spatial features of apartment houses North Golshahr and Nazarabad neighborhoods was evaluated.



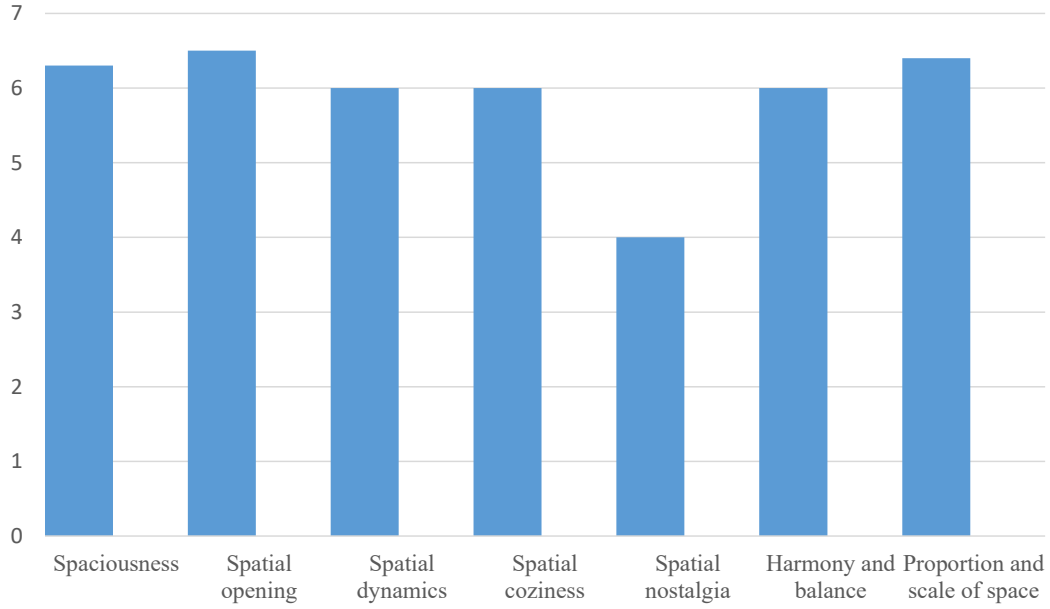
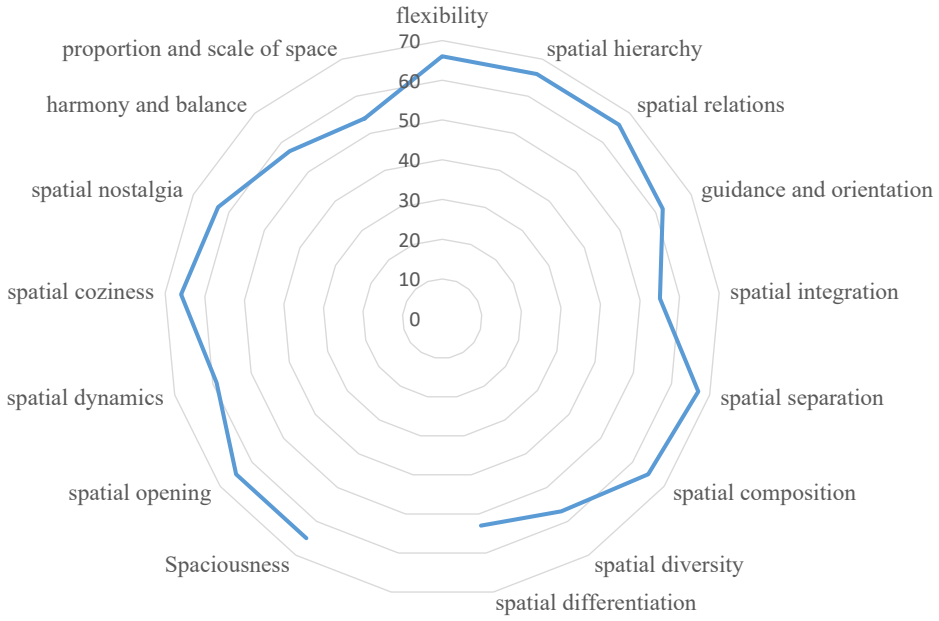


Fig. 3. The "Structural-Functional" (Left Inset) and "Qualitative-Psychological" (Right Inset) Features of Researched Houses in Bandar Abbas Neighborhoods Scored based on the Delphi Method

Figure 4 demonstrates the importance of the spatial features in the studied neighborhoods and compares their fulfillment in the currtent status of the apartment houses based on the Delphi method. This figure aims to elucidate the gap of non-fulfillment of the spatial features in these neighborhoods. Similarly, Figure 5 depicts the fulfillment of verified spatial features in the current status of apartment houses in the studied neighborhoods based on the Delphi method. As shown, except for the first two cases, the degree of fulfillment is lower than the mean value. Likewise, the degree of fulfillment is more for "spatial separation", "proportion and scale of space", and "spaciousness", and is less for "space nostalgia", "spatial opening", and "flexibility".



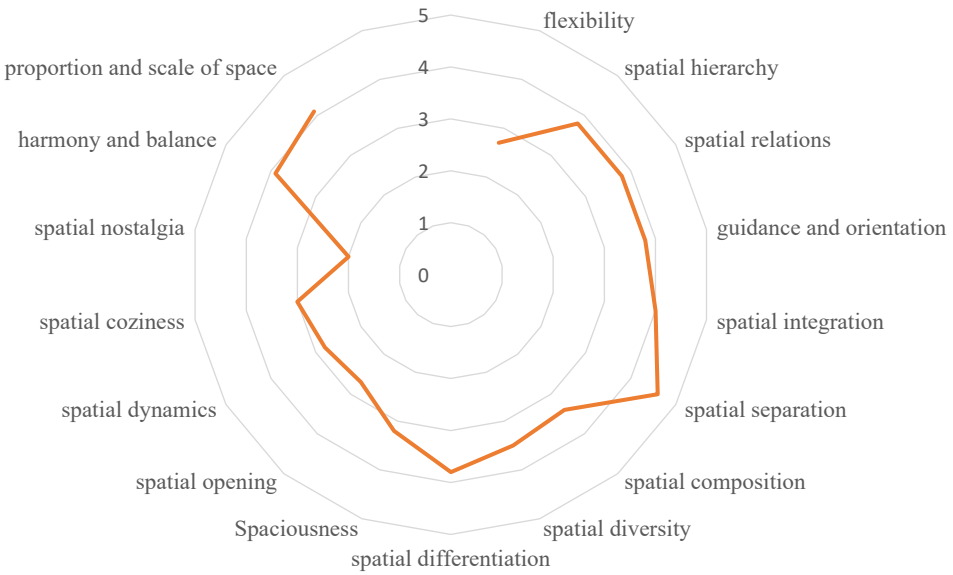


Fig. 4. The Importance of Spatial Features of Apartment Houses in the Studied Neighborhoods (Top Inset) and their Fulfillment in the Current Condition of Apartment Houses (Below Inset).

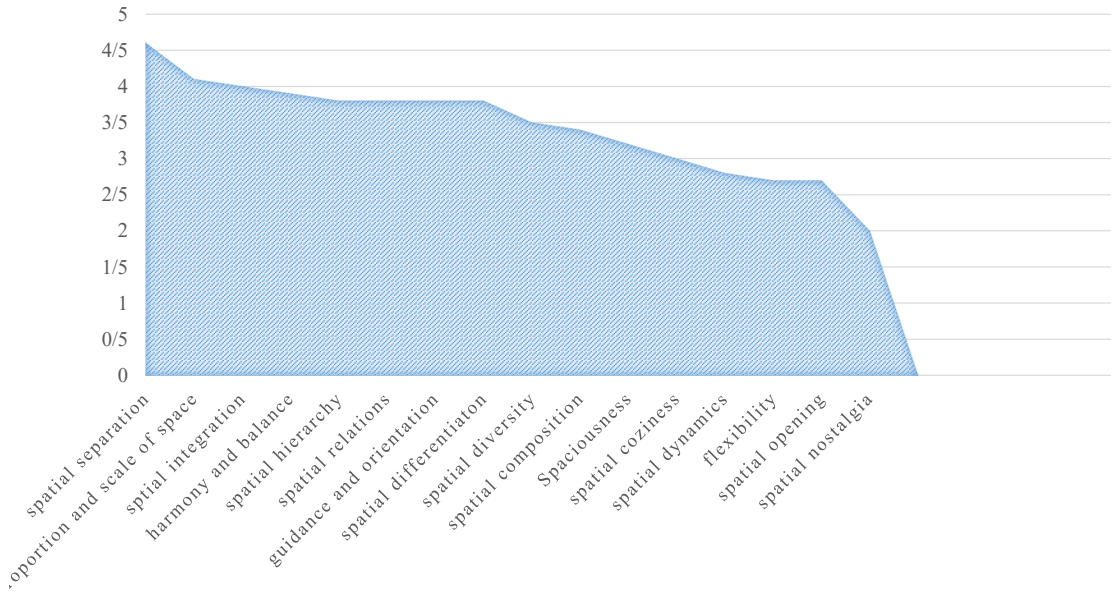


Fig. 5. The Degree of Fulfillment of Verified Spatial Features in the Current Status of Apartment Houses in the Studied Neighborhoods is based on the Delphi Method

In the third evaluation step based on the Delphi questionnaire, the degree of fulfillment of the verified spatial features in the current status of the apartment houses in the studied neighborhoods was assessed concerning their importance. As shown in Figures 6 and 7, the mean scores of features in the current status and their importance were compared based on the opinions of experts. The aim was to perceive the gap between the importance and non-fulfillment of the features for planning and designing apartment houses in the studied neighborhoods. As shown for categorizes "spatial separation" and "proportion and scale of space", the gap between the degree of importance and non-realization is trivial. By contrast, such a gap is bigger for categorizes "spatial nostalgia" and "flexibility".

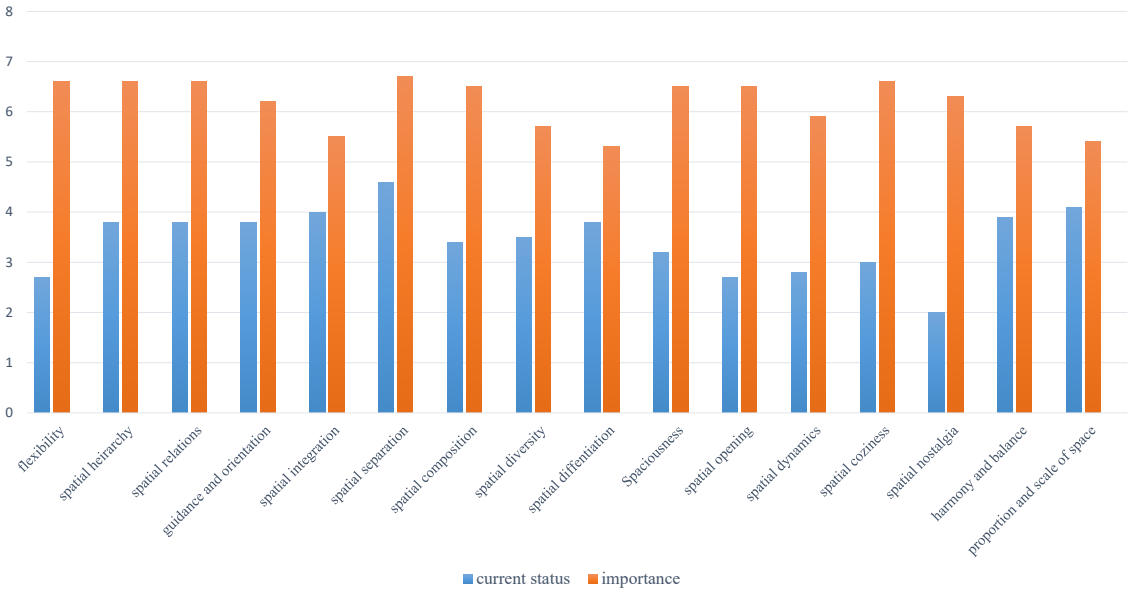


Fig. 6. The Importance of the Interior Spatial Features under Study and the Degree of their Fulfillment in the Current Status based on the Opinion of Experts.

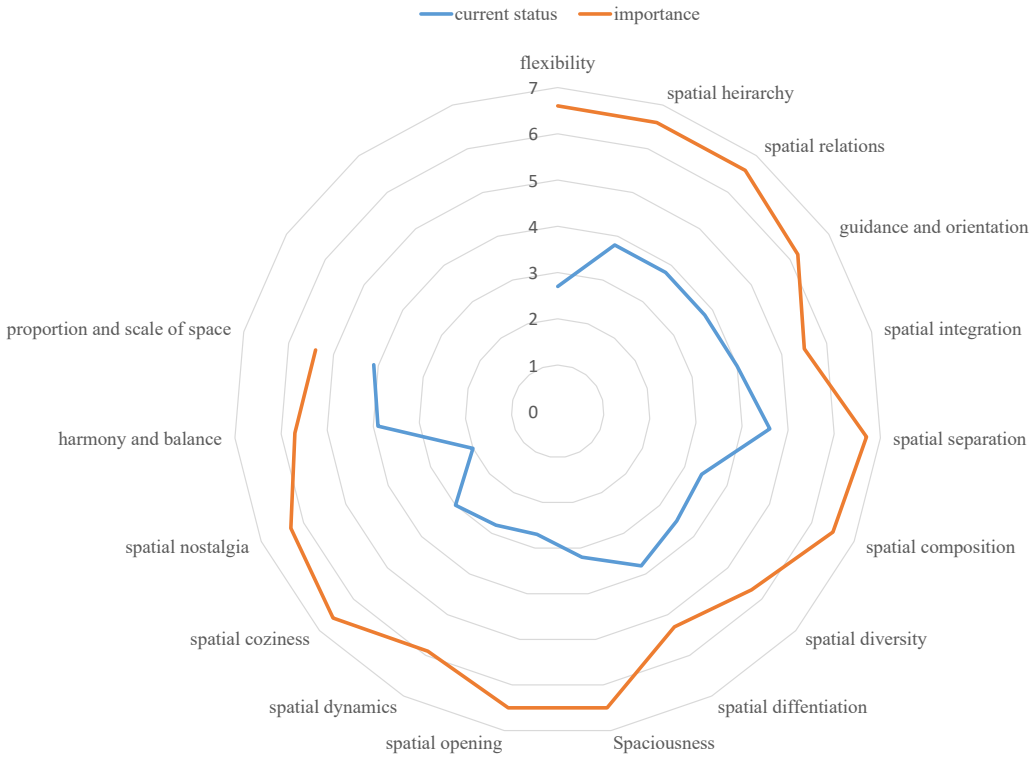


Fig. 7. The Importance of the Interior Spatial Features of the Studied Apartment Houses and their Fulfillment in the Current Status based on the Opinion of Experts

6. DISCUSSION AND CONCLUSION

The interior spatial features of apartment houses play a vital role in the quality of living spaces and largely contribute to resolving problems with the designs regarding satisfaction with the interior space of the house. In this research, 28 spatial features were identified theoretically from the literature.

After verification and evaluation by the experts living in Bandar Abbas, the spatial features were reduced to 16 features for North Golshahr and Nazarabad neighborhoods. Regarding the research's first question, the spatial features specified based on the experts' opinions were, by the order of importance, spatial guidance and orientation, spatial opening, spatial composition, proportion of space, spaciousness, spatial hierarchy, spatial relations, spatial dynamics, spatial coziness, harmony and balance, spatial separation, spatial flexibility, spatial diversity, spatial differentiation, spatial integration, and space nostalgia.

Regarding the research's second question, the experts living in Bandar Abbas scored all the detailed spatial features to determine their importance and ensure the correctness of classifying these features into "structural-functional" and "qualitative-psychological" categories. Although both categories were confirmed by experts, the "structural-functional" category outperformed the "qualitative-psychological" category in influencing the studied features.

Concerning the research's third question, the degree of fulfillment of spatial features in the apartment houses in the studied neighborhoods was classified. As such, the degree of fulfillment was lower than the mean evaluation, with the higher to lower degrees belonging to "spatial separation", "proportion and scale of space", "spatial integration", "harmony and balance", "spatial hierarchy", "spatial relations", "guidance and guidance", "spatial differentiation", "spatial diversity", "spatial composition", "spaciousness", "space coziness", "spatial dynamics", "spatial flexibility", "spatial opening", and "spatial nostalgia", respectively. According to experts, the importance and fulfillment of the studied spatial features were higher than the current status of apartment houses in the studied neighborhoods. By comparison, the gap regarding the importance and fulfillment was lower than the current status for "proportion and harmony of space" and "spatial separation", and was higher than the current status for "spatial nostalgia" and "flexibility" compared to other studied spatial features.

According to these results, future research is recommended to investigate each of these spatial features separately and evaluate features that are closely correlated to each other from a semantic perspective. Further, the correlation between these spatial features and variables such as age, gender, household composition, income, education level, and residence history need to be studied in future research. Likewise, the methodology of this research needs to be applied to other Iranian living apartment houses to include more and optimize spatial features. Eventually, the spatial features need to be evaluated in future research in the mid-, semi-private, and public areas of apartment units.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

MORAL APPROVAL

The authors commit to observe all the ethical principles of the publication of the scientific work based on the ethical principles of COPE. In case of any violation of the ethical principles, even after the publication of the article, they give the journal the right to delete the article and follow up on the matter.

PARTICIPATION PERCENTAGE

The authors state that they have directly participated in the stages of conducting research and writin

REFERENCES

- Alexander, Christopher. 2002. *The nature of order: an essay on the art of building and the nature of the universe*. Center for Environmental Structure: Berkeley, California.
- Bokharaee, Saleheh. 2015. Spaciousness: its Aspects and Impacting Factors. *Soffeh* 25(2): 5-18. https://dorl.net/dor/20.1001.1.1683870.1394.25.2.1.9
- Chen, Jason, Cynthia Chen, and Harry J. P. Timmermans. 2008. Accessibility Trade-Offs in Household Residential Location Decisions. *Transportation Research Record* 2077(1): 71-79. https://doi.org/10.3141/2077-10
- Ching, D. K. Francis. 2014. *Architecture, form, space and order*. 20th edition. Translated by Zohre Gharagezlou. Tehran: Tehran University Press. [in Persian]
- Dashti, Mina. 2022. Efficient spatial features on phenomenon of place-emotion in a conventional residential apartment unit in iran. Ph.D. dissertation in architecture. Isfahan Art University. https://library.aui.ac.ir/inventory/108/6939.htm. [in Persian]
- Deng, Zhong. 2019. House and Home: The Meaning Production of House and Family. *School of Sociology* 7(2): 7-13. https://doi.org/10.12677/MA.2019.72002
- Einifar, Alireza. 2003. A model for analysis of flexibility in traditional Iranian housing. *Journal of Fine Arts: Architecture & Urban Planning* 13: 64-77. [in Persian]
- Gehrke, Steven R., Kristina M. Currans, and Kelly J. Clifton. 2018. Assessing the Importance of Housing, Accessibility, and Transportation Characteristics on Stated Neighbourhood Preference. *International Journal of Urban Sciences* 23(1): 49-66. https://doi.org/10.1080/12265934.2018.1436983
- Golestani, Saeid, Isa Hojat, & Mehdi Saedvandi. 2018. A survey on spatial integration and the process of evolution in the Iranian mosque. *Journal of Fine Arts: Architecture & Urban Planning* 22(4): 29-44. https://doi.org/10.22059/jfaup.2018.65695
- Habibi, Arash, Azam Sarafrazi, and Sedigheh Izadyar. 2014. Delphi Technique Theoretical Framework in Qualitative Research. *The International Journal of Engineering and Science* 3(4): 8-13. https://www.theijes.com/papers/v3-i4/Version-4/B034040008013.pdf
- Habibzadeh Omran, Mohammad, Alireza Einifar, and Azade Shahcheraghi. 2022. The Impact of "Spatial Organization Types" of Apartment Residential Units on "Privacy and Social Interaction" Case Study of Conventional Residential Apartments in Amol. *CIAUJ* 7(1) :113-129. http://ciauj-tabriziau.ir/article-1-341-fa.html
- Haeri Mazandarani, Mohammadreza. 2015. *House, culture, and Nature in Iranian Architecture*. Tehran: Publications of the Urban Planning and Architecture Study and Research Center. [in Persian]
- Hafez Nia, Mohammad Reza. 2016. *An introduction to research methods in human sciences*. Tehran: SMT Publications. [in Persian]
- Hillier, Bill, and Julienne Hanson. 1984. *The Social Logic of Space*. New York: Cambridge University Press.
- Kurt Grütter, Jörg. 2019. *Ästhetik der Architektur: Grundlagen der Architektur-Wahrnehmung*. Springer Vieweg Wiesbaden.
- Tabatabaei Malazi, Fatemeh, Atieh Malakavarzamani, and Jaleh Sabernejad. 2020. Social Logic of Kitchen Space in Vernacular Architecture (Case Study: Qeshm Housing) - Examination and Analysis. *Space Ontology International Journal* 9(3): 61-73. https://dorl.net/dor/20.1001.1.23456450.2020.9.3.6.2
- Memarian, Gholamhossein. 2014. *A guide to the theoretical foundations of architecture*. Tehran: Soroush Danesh Publications. [in Persian]
- Norberg Schulz, Christian. 1988. *Roots of Modern Architecture*. Edited and photographed by Yukio Futagawa. Tokyo: A.D.A Publisher.
- Short, John Rennie. 2014. *Urban theory: A critical assessment*. Macmillan International Higher Education.
- Teck-Hong, Tan. 2011. Neighborhood preferences of house buyers: the case of Klang Valley, Malaysia. *International Journal of Housing Markets and Analysis* 4(1): 58-69. https://doi.org/10.1108/17538271111111839
- Thoring, Katja, Pieter Desmet, and Petra Badke-Schaub. 2018. Creative environments for design education and practice: A typology of creative spaces. *Design Studies* 56: 54-83. https://doi.org/10.1016/j.destud.2018.02.001.
- Tam, Vivian W. Y., Ivan W. H. Fung, Jing Wang, and Mingxue Ma. 2019. Effects of Locations, Structures and Neighbourhoods to Housing Price: An Empirical Study in Shanghai, China. *International Journal of Construction Management* 22(7): 1288-1307. https://doi.org/10.1080/15623599.2019.1695097
- Von Meiss, Pierre. 2013. *Elements of Architecture from Form to Place + Tectonics*. Chicago: The University of Chicago Press.
- Xiaojin Liang, Yaolin Liu, Tianqi Qiu, Ying Jing, and Feiguo Fang, 2018. The effects of locational factors on the housing prices of residential communities: The case of Ningbo, China. *Habitat International* 81: 1-11. https://doi.org/10.1016/j.habitatint.2018.09.004.

- Zanganeh Najmeh, Mutzorzadeh Hamed, Maleeha Taghipour, and Tahereh Nasr. 2019. Investigating the effect of different types of spatial structure on the degree of separation of public and private territories in the introverted traditional houses of Iran using the method of space arrangement, case study: Qajar houses of Shiraz. *Urban and rural management* 19(59): 45-62. https://ijurm.imo.org.ir/article-1-2870-fa.html

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