

Utilizing Mazandaran's Local Architectural Elements to Increase Vitality and Livability in Babolsar's Residential Complexes; Case Study: Babolsar City's Mehr Residential Complexes*

Seyyed Ali Seyedian^{a**} - Sahel Ahmadi^b

^a Assistant Professor of Architecture, Faculty of Art and Architecture, University of Mazandaran, Iran (Corresponding Author).

^b M.A. of Architecture, Pardisan Institute of Higher Education, Babolsar, Iran.

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ABSTRACT

Mehr Residential Complexes in Mazandaran's Babolsar City have failed to pay as much attention as needed to the fundamental concepts of vitality and livability in their living environments due to a quantitative approach to housing designs and growing demands in this connection. This subject, together with the interplay of residents' quality of life, would require a comprehensive yet systematic pattern of vitality and livability for residential environments. Mazandaran's local housing architecture has also offered solutions to bond components of vitality and livability that may influence people's daily lives and their living conditions. To understand the local architectural properties of Mazandaran, it is required to identify these components and apply them in current housing design processes. For this, the goal of this study was to provide solutions to strengthen the quality of residential spaces in Babolsar City by recognizing components of vitality and livability through local housing architecture in the Iranian province of Mazandaran. The literature review helped provide patterns of vitality and livability and generalize them to local architecture through the collection of field data. The random sampling method was used to produce a 175-person sample of residents in four Mehr Residential Buildings in Babolsar, and a questionnaire was later administered to them. The questionnaire was analyzed using the SPSS software. Factor analysis results suggested that out of the seven factors of vitality (e.g., urban vitality/happiness, physical indicators, psychological dimensions, promoting spatial-activity desirability, focus on residents, security and safety, and contact with nature), five factors were significant, whereas the fourth and seventh factors were eliminated by architecture and urban planning experts despite their levels of importance.

Keywords: Components of Vitality, Livability, Local Architecture, Residential Complexes, Babolsar.

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** E_mail: a_seyedial@umz.ac.ir

1. INTRODUCTION

As the first human living environment, the house has been affected by widespread developments in the last centuries. These developments were affected by changing social, economic, and cultural structures, as well as changing human lifestyles. A variety of different housing designs has always led to a reduction in quality. Meanwhile, the employment of Western technologies and modern equipment in Iran has affected all scientific disciplines, especially architecture and construction, as housing textures barely represent the vitality of the past. Residents are nowadays detached from natural elements (e.g., the sky, the earth, and nature itself) and are being led in enclosed spaces by numerous technologies. It is understood that vitality and livability are key components of a high-quality place; over time, after experiencing life in today's houses, the modern human is now eagerly seeking to achieve the sense of vitality he has lost despite all the means of comfort he possesses now. On the other hand, understanding this and the relevant environmental characteristics of the past, as well as the current challenges facing man, requires a greater focus on this subject.

A notable example of this is residential complexes where residents are overwhelmingly affected by living conditions and physical properties. Following a series of reviews, it was found that the Mehr Residential Complexes of Babolsar, particularly the Danesh Residential Complex, have been suffering from exacerbating conditions and rising resident dissatisfaction due to the adverse conditions of transferring residential units, renting them to

strangers, using them on holidays and special occasions, and maintaining them as assets, resulting in the widespread vacancy of units during the year. Hence, it is increasingly becoming important to delve into this subject and provide guidelines to help improve the quality of construction of residential environments based on future residents' needs. The main objective of this study was to identify patterns of Mazandaran's local architecture and the factors improving vitality and livability and understand how to favorably and practically employ those local architectural patterns and their relevant indicators and standards to strengthen the quality of modern architecture. After extracting Mazandaran's local architecture components that influence the vitality and livability of living conditions, the views of residents in residential complexes over the extent to which the components could be related together were evaluated using a survey study in the form of a questionnaire. To this end, the residents' views were analyzed using the SPSS software. This was followed by analyzing the components, providing solutions to meet the goals, and presenting the results.

2. LITERATURE REVIEW

This study employed the literature that was both directly and indirectly concerned with the subject under study. The following presents the main theories quoted by the theoretical literature on vitality and livability in urban architecture, with a greater focus on the category of vitality (Table 1).

Table 1. Scholarly Theories on Vitality and Livability

| Scale | Theorists | Year | Criteria Creating Vitality and Livability |
|-------|---------------|------|--|
| City | Lynch | 1981 | <ol style="list-style-type: none"> 1. Survival 2. Safety 3. Adaptability 4. The health and genetic diversity of creatures are economically useful for humans. 5. The current stability and the future of all biological communities (Lynch 1981) |
| | Jacobs | 2002 | <ol style="list-style-type: none"> 1. The area and each of its internal divisions should serve more than one and preferably more than two main functions. 2. The majority of the blocks should be small in size. 3. The area should involve buildings with different ages and conditions. 4. Popular density (Jacobs 2002) |
| | Golkar | 2007 | <ol style="list-style-type: none"> 1. On a micro scale, [a city] refers to the diversity of activities in the public arena and its adaptation to urban spaces within a construct consisting of behavioral settings. 2. On a macro scale, [a city] refers to a set of (non) physical features and organizational systems (Golkar 2007) |
| | Antolín-López | 2024 | Urban livability is concerned with the city's capacity to provide residents with opportunities for progress, having a good quality of life, and understanding a satisfactory living condition (Antolín-López, Martínez-Bravo, and Ramírez-Franco 2024). |

| Scale | Theorists | Year | Criteria Creating Vitality and Livability |
|--------------|------------------|------|--|
| City | Bedi | 2023 | 1. Livability stimuli are classified into three wide-ranging dimensions: sustainability-environmental, economic, and social. 2. Livability evaluation approaches: Based on a set of combined criteria, these approaches include human welfare and growth, and various thematic concepts and categories across national and global development plans. These indicators include the Human Development Index (HDI), Gross National Happiness Index, Quality of Life, and Quality of Life Index (Bedi, Kansal, and Mukheibir 2023). |
| | Hojjat | 2011 | Architecture is concerned with forming the place where man lives. For this, architecture practically focuses on two factors: "form" and "life" (Hojjat 2011). |
| Architecture | Deljooy Kooshali | 2015 | 1. Vitality 2. Happiness 3. Life satisfaction (Deljooy Kooshali et al. 2015). |
| | Babaei | 2015 | 1. Psychological index 2. Texture index 3. Service index (Babaei, Zoovarzi, and Rahbarimanesh 2015) |

3. THEORETICAL FOUNDATIONS

3.1. Concepts of Vitality and Livability

Life cannot be constructed; rather, it can only be created through some processes (Alexander 1979). Concerning the concept of vitality, some equivalent terms, including liveliness and livability, have been provided by Western theories (Bazvandi and Shahbazi 2014). Vitality serves as a component that brings about an overall quality of the environment (Mikaelzadeh, Vaziri, and Bagheri 2014) and is realized by residents' attachment to their living environments and sense of belonging to place (Taher Tolou Del and Sadat 2017). For this, the knowledge of the guidelines that may affect vitality and properly systematic designs could be effective in the mental and physical health of residents (Molaeihashjin et al. 2021). Vitality is one of the main design components, involving a complex yet multifaceted concept with overlapping dimensions. Despite vitality being an interdisciplinary term and suffering from a theoretical gap in architecture literature, a review of its differences and similarities, as provided by psychology and sociology, which may overlap with its definitions in architecture, as well as its differences from other closely related concepts in architecture and urban planning, would help incorporate some other terms such as quality of life, livability, and sustainability (Sanatgar Kakhaki et al. 2024).

The concept of urban livability cannot also be separated from human settlements, although it lacks a universally agreed definition. This concept is also characterized by various dimensions that may influence the attractiveness and quality of life in a city (Ghasemi 2024). As a multi-faceted concept, livability helps examine the growing impacts of public and private measures and successful urban practices (Mansouri 2019). Livability is a feature not just limited to some environmental characteristics;

rather, it also concerns functions based on an interplay between personal and environmental characteristics. The definition of this concept may vary from one culture to another or from one period of time to another; additionally, it is a relative concept whose general meaning concerns the time, place, and value/judgmental system of assessors and the objective of assessment (Saitluanga 2014).

3.2. Patterns of Vitality and Livability

The terms vitality and livability characterize what would likely be the backbone of a building and may well represent how they would create a living building. The key point, however, is that each building or city, as a whole, consists of some specific elements called a pattern (Alexander 1979). Components of the universe are perceived as a pattern, with some patterns being constantly identical with greater levels of order and systematicity and some others created spontaneously (Lang 1987). The second point is that understanding the processes underlying these patterns, i.e., understanding the sources constituting the main components of the building, would require a specific method (Alexander 1979).

In the book *The Pattern Language*, Alexander presents 253 patterns. In his book *A Theory of Good City Form*, Lynch writes of Alexander's book: Christopher Alexander's coherent book, i.e., *The Pattern Language* is a lengthy and integrated context about a good environment. This book provides patterns in detail and describes them as "time-independent" and "natural" techniques used for construction and could be well received and applied by all people in all places, and seasons. However, the book does not concern cultural, political, and economic, as well as individual values (Lynch 1981).

Meanwhile, utilizing local architecture and its elements for each specific region could embrace the above differences. Despite its transformation in the




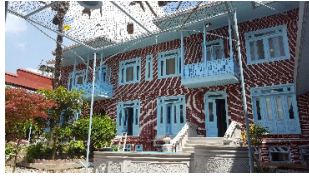
course of history, local architecture is still capable of maintaining its special identity. This architecture features a credible identity of people in a piece of land, representing their customs, spirits, sentiments, thoughts, arts, and tastes. Local architecture is formed by social and economic relations within a natural environment, representing cultural symbols that manifest simplicity (Alpago Novello et al. 2005). In this connection, compared to other popular architecture, residential architecture reveals the connection between the building's fabric and manners of living and social-cultural characteristics (Raheb and Torkashvand 2014). Local residential architecture is characterized by its adaptation to the needs and responses to the problems of the users who were themselves engaged in the building construction; for this, the manner the building adapts to physical and cultural needs could help understand the very characteristics of this type of architecture (Khakpour et al. 2015). In considering Kevin Lynch's comments about Alexander's vitality patterns, the following examines the latter's patterns and their roots in regional local architecture.


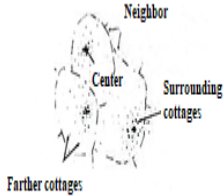
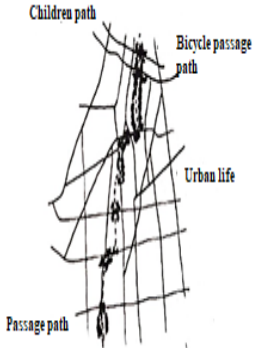

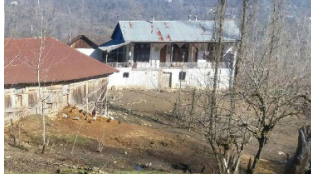
3.3. Outlining a Conceptual Framework






To provide a framework, some criteria were determined by library studies and field surveys, as

well as by consulting architecture and urban planning professors and experts, which helped distinguish components of vitality. These criteria were selected to involve all dimensions of vitality, including social, physical, and environmental dimensions. The criteria were categorized into three scales (Alexander 1977): city, architecture, and architectural interior details. The questionnaire items were also developed accordingly, as described in detail in the Methodology section. The study images were also captured by researchers through direct observation and comparing patterns of vitality in Mazandaran's local houses (Babol City). When no patterns were observed, a direct reference was made to Alexander's Standard Patterns (Alexander 1977). It is noteworthy that the area under study was the city of Babolsar, but the neighboring city (Babol) and its surrounding villages were used for the study due to the shortage of resources in Babolsar (e.g., shortages of local construction and regional pristine patterns). Meanwhile, adherence to local architectural symbols and principles, which bore a resemblance to the user's subjective schemata and were known to them, appeared to affect their perception of the space and consequently, their better contact with it. Each of the patterns involves a solution to using factors of vitality which provides some details about design processes (Table 2).

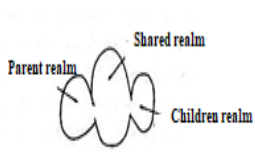
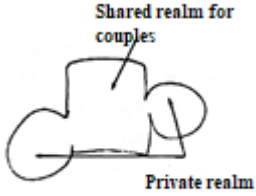
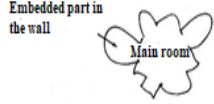

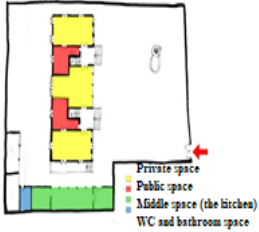
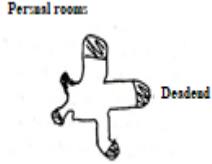
Table 2. Comparing Patterns of Vitality and Livability with Local Regional Architecture


| Dimensions | Scale | Variables | Description | Images |
|------------|-------|---|---|---|
| Social | City | A combined pattern of sub-cultures (security) | Dividing the city into smaller sections; the location of the relatives' houses next to each other; familiarity with each other; understanding habits and lifestyles of each other; the sense of security and the lack of fear due to familiarity. |  |
| | | Main gateways | Using a defined entrance for the neighborhood; determining limits; controlling permeability |  |
| | | Decentralized workplace | The distance between the workplace and the house takes 20-30 minutes. |  |
| | | Combination/integration of the house (A factor for sociability in people) | The link between the father's and the son's houses using an interior doorway through the courtyard; more concrete and tangible contact between people and groups of various ages |  |

| Dimensions | Scale | Variables | Description | Images |
|--------------|-------|---------------------------------------|---|---|
| Social | City | Comprehensiveness (privacy and life) | Distinction between the houses; the adaptation of the houses to people's needs: the location of the building in a private and isolated, crowded, and an in-between place |  |
| | | A place for the elderly | Establishing a care and nursing center in the living place and creating a sense of being familiar; being together; not being away from the younger people; creating job opportunities; and taking care of children by these people if possible. |  |
| | | Children in the city | Establishing a traffic system for children in front of houses and places with many windows, if possible, to help provide security. |  |
| Architecture | | Personal house (ownership) | Owning a shelter as a house; creates a deep sense of the house |  |
| | | Personal terraces overlooking streets | Appropriate contact between the street and the house |  |

| Dimensions | Scale | Variables | Description | Images |
|---------------|--------------------------------|---|--|---|
| Social | Architecture | Windows overlooking life | The location of windows overlooking the view and the landscape |  |
| | Architectural Interior Details | Semi-open walls | Relationship between closed spaces; for example, creating a space between the rooms through a middle semi-open space |  |
| Environmental | City | Rejuvenating areas (locating areas for building construction) | Reducing environmental destruction; non-construction of the building in areas and a charming scenery |  |
| | | 13. Fruit trees | Planting fruit trees in public spaces; protecting them by experienced people. |  |
| | | 14. Four-story buildings | Shortening the distance between the resident and the ground; avoiding their isolation, and constructing up to four-story buildings |  |

| Dimensions | Scale | Variables | Description | Images |
|---------------|--------------------------------|--|---|---|
| Environmental | Architecture | 15. Animals | Keeping animals on personal property, such as chickens, hens, roosters, etc.; creates an extended fence compound. |  |
| | | 16. Vegetable gardens | Helping people in the region to supply fresh vegetables by constructing a sunlit space and planting private and public gardens |  |
| | | 17. Places with sunlight | Finding a space that receives the highest amount of sunlight; a place for growing vegetables and a place for work under the sunlight. |  |
| | Architectural Interior Details | 18. External room | A sunlit space surrounded by an extended fence |  |
| | | 19. Illumination from two directions | The location of the windows on the external walls overlooking the external space at least from two directions |  |
| Physical | City | 20. Residential complexes (harmonization of the buildings) | Avoiding construction of large and integrated buildings |  |
| | | 21. Places for the passage and parking of bicycles | Designing a path for bicyclists by being separated from streets and sidewalks; a place for parking bicycles |  |

| Dimensions | Scale | Variables | Description | Images |
|--------------------------|-------|--------------------------------|---|---|
| Physical Architecture | | 22. A house for a small family | Establishing three realms in the house; a realm for parents, another for children, and a shared place in between to help create contact |  |
| | | 23. A house for young couples | Halving the house: a shared realm that is social and a private realm that is personal. |  |
| | | 24. A single house | Contact with other houses in a way that it is part of a larger house; observing simplicity in the house space |  |
| | | 25. Main entrance | Outside the building; being visible; higher than the other places; being outstanding |  |
| | | 26. Private space | The spaces start from the entrance, go through the public spaces, and then lead to the private spaces: the public space is positioned in the frontal part, with the bathroom and WCs being between the two private and public spaces. |  |
| | | 27. Personal room | Dedicating a room to each member of the family away from shared spaces |  |
| | | | | |

| Dimensions | Scale | Variables | Description | Images |
|--------------------------------|--------------|-----------------------------|---|---|
| Physical | Architecture | 28. Central Kitchen | A space larger than its natural size; being established in the middle of the space of the building; being exposed to the sun; a place for laying a large table for serving food |  |
| | | 29. Gardens on the rooftop | Using a flat roof as a garden or terrace |  |
| | | 30. Courtyards full of life | View of a larger space, with two or three doorways of the building opening towards it; placing the iwan close to it |  |
| Architectural Interior Details | | 31. Living room | Not constructing the [living room] in the middle of the way; being circular, with comfortable furniture |  |
| | | 32. Balcony | Enough space for two or three people to sit down; Moving back part of the balcony backward to the interior phase |  |

4. METHODOLOGY

This study employed a questionnaire called “Vitality Components of Local Architectural in Designing Residential Complexes”. This tool included 32 items responded on a five-degree Likert scale ranging from “Completely Agree” to “Completely Disagree”. The responses were assigned scores 1-5, with scores of each factor calculated separately. Items 6, 7, 20, and 21 measured urban vitality, Items 22, 23, 24, 25, 26,

27, 28, 31, and 32 physical indicators, Items 5, 9, 10, 11, 12, and 14 psychological dimensions, Items 17, 18, and 19 promoting spatial-activity desirability, Items 3, 4, and 8 focus on residents, Items 1 and 2 safety and security, and Items 13, 15, 16, 29, and 30 contact with nature. In general, all items measured the application of vitality components of local architecture in designing residential complexes” (Fig. 1).

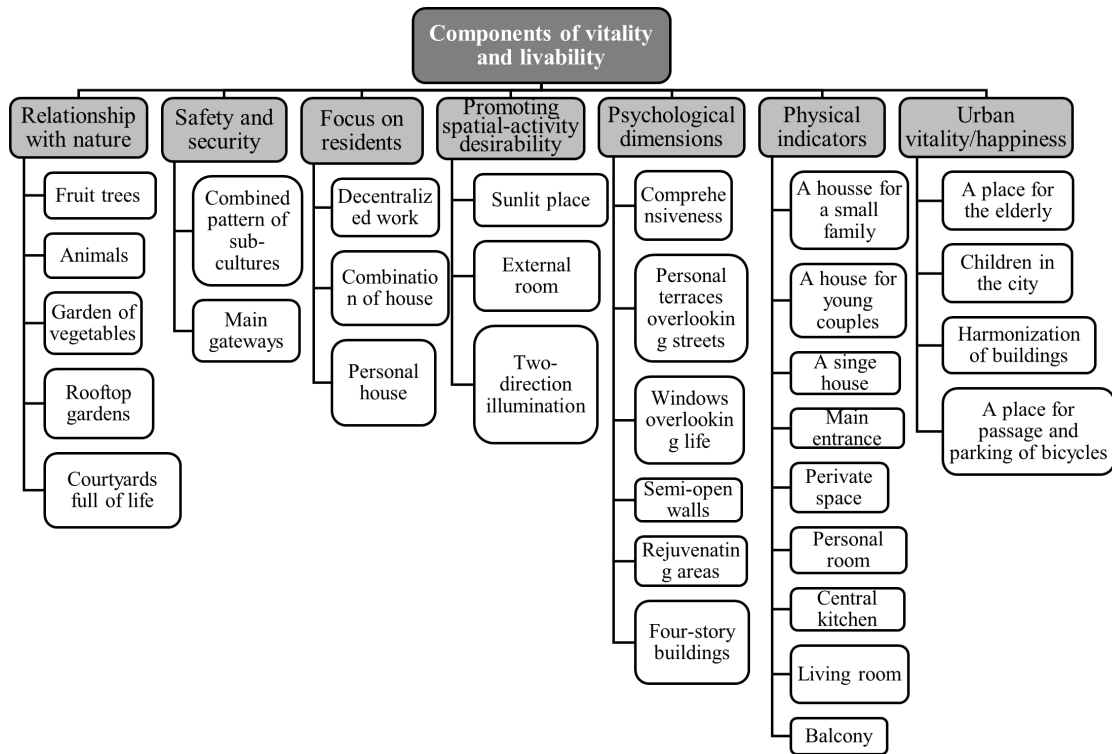




Fig. 1. Categorization of Vitality and Livability Components (Ahmadi 2018)


4.1. Sample Population and Sampling Method

The statistical population of this study consisted of all residents in Babolsar City’s Mehr Residential Complexes (e.g., Danesh, Talash, Basir, and Jaame-Jam 1 complexes), as shown in Table 3. With around one-third of the residential units present in the studied complexes, the Morgan Table was used

to directly question 175 residents through a simple random method. The questionnaires were then factor analyzed using the SPSS software, the varimax rotation, and main component analysis methods. The KMO was estimated at 0.882, being greater than the factor criterion of 0.7 and showing the adequacy of the sampling.

Table 3. Statistical Review of Babolsar City’s Residential Complexes

| Mehr Residential Complexes | Complex Images | Number of Blocks | Number of Units | Aerial Images |
|----------------------------|---|------------------|-----------------|---|
| Danesh |  | 30 | 162 |  |

| Mehr Residential Complexes | Complex Images | Number of Blocks | Number of Units | Aerial Images |
|----------------------------|---|------------------|-----------------|---|
| Talash |  | 49 | 294 |  |
| Basir |  | 36 | 288 |  |
| Jaam-e-Jam 1 |  | 4 | 192 |  |

4.2. Questionnaire Evaluation Methods

To evaluate this scale, the following three methods were used: item analysis, validation measurement, and reliability measurement.

To analyze the items, the Discrimination Index and Loop Method were used. Findings showed that Items 18 (external rooms) and 19 (illumination from two directions) were eliminated due to the increased validity coefficients of the remaining items.

To validate the questionnaire and respond to the question if the questionnaires were measuring what they had been designed for or not, two methods of content validity and construct validity were used. It should be pointed out that the questionnaire was provided to 30 residents to ensure its items were comprehensible. In the end, the final questionnaire was provided to the residents.

To determine if the items underlying the questionnaire were composed of several significant saturated factors, exploratory factor analysis was performed through the main component analysis and varimax rotation.

The factors obtained from exploratory factor analysis were analyzed based on confirmatory factor analysis using the Amus Software.

5. FINDINGS

After the elimination of Factors 4 and 7 obtained from exploratory factor analysis, goodness-of-fit indexes were improved.

5.1. Introducing Factors

1. Urban vitality/happiness
2. Physical indicators
3. Psychological dimensions
4. Promoting spatial-activity desirability (eliminated after confirmatory factor analysis)
5. Focus on residents
6. Safety and security, and
7. Contact with nature (eliminated after confirmatory factor analysis)

The present study determined five factors of the components of vitality (intended by residents to help create vitality in designing patterns) which were also independent of each other. Also, as stated earlier, all items of the questionnaire measured the components of vitality that residents said were involved in designing residential complexes using local architectural experiences. The reliability of this questionnaire was measured by calculating Cronbach's alpha, with each factor measured by the factors' coefficients of reliability. In the end, the overall reliability of the questionnaire was measured. Table 4 below shows the total reliability of the questionnaire.

Table 4. Reliability Coefficients of the Factors and the Entire Scale

| Factors | Alpha Coefficients |
|-------------|--------------------|
| Factor 1 | 0.430 |
| Factor 2 | 0.812 |
| Factor 3 | 0.623 |
| Factor 4 | Eliminated |
| Factor 5 | 0.10 |
| Factor 6 | 0.302 |
| Factor 7 | Eliminated |
| Total scale | 0.888 |

6. CONCLUSION

This study aimed to develop appropriate patterns to enhance the vitality and livability of residential complex spaces in Babolsar City. In doing so, the study did the following procedure:

1. Extracting Alexander's vitality patterns;
2. Collecting studies conducted on the local architecture of Mazandaran (the city of Babol and surrounding villages) and analyzing several local house samples based on their vital spaces;
3. Investigating and comparing regional local buildings based on Alexander's vitality patterns;
4. Developing a questionnaire and surveying residents to understand people's emerging needs;
5. Comparing and analyzing the findings: Here, the second factor "physical indexes" and the third factor "psychological dimensions" held the highest rates of reliability. It seemed like the residents' priority for creating vitality and livability in their residences was physical indicators which they could use to strengthen their influence in the spatial arrangement and expanding realm of their private life. This priority

was followed by psychological dimensions, including the building's external areas and its overlooking spaces, which mostly contributed to the vitality and livability of their residential environments. The third and most influential factor contributing to increasing vitality and livability was known to be urban vitality, as the fourth and seventh factors, i.e., promoting spatial-activity desirability and contact with nature, respectively, were eliminated by architectural and urban planning experts despite their level of importance and based on relevant questionnaire evaluations. This came after experts determined that a private realm could not alone produce vitality and livability for residential environments, as popular participation and contact with the nature surrounding the place of living could affect the expansion of vitality and livability. Meanwhile, to meet the goals stated above, contact with nature, i.e., incorporating green spaces into private realms, could be promising.

6. Presenting design solutions (as given in Table 5) to increase vitality and livability in residential complexes.

Table 5. Details of Design Solutions

| | Patterns | Solutions |
|---|---|--|
| 1 | Combined Pattern of Sub-Cultures (Security) | Dividing the site into blocks and partitioning each block; creating a smaller neighborhood scale for residents' better familiarity. |
| 2 | Main Gateways (Fig. 2) | Creating a central courtyard in each block with certain pedestrian entrances; shortening the passageway width that may control permeability. |
| 3 | Decentralized Work | Shortening the distance to work for the employee to frequent from the workplace to their houses on foot to dine and do other things; reducing noise pollution caused by traffic; considering a so-called working space in the residential environment by observing standards |
| 4 | House Combination (a Factor for Sociability among People) | Establishing relationships between the units by locating them on each floor to make up for the loss of internal relationships between the houses; observing neighboring features; considering a shared area without the risk of violating each other's privacy |
| 5 | Comprehensiveness (Privacy and Life) | Classifying the houses into the houses located near the highly-frequented streets (crowded places), the houses located at the endpoints of the site (empty places), and the houses located between these areas; paying attention to residents' spirits |

| | Patterns | Solutions |
|----|---|---|
| 6 | The Place for the Elderly | Considering single-bedroom units of low area for the elderly along with other units to not separate their living places; taking care of children on the ground floor where the children's playground is located; gathering in collective places of the site. |
| 7 | Children in the City | Dedicating a bicycle/bike place on the margins of the blocks; establishing a pedestrian zone to avoid car traffic; locating these zones near the buildings with an utmost view due to the location of the kitchen on the edges of the building; dedicating a playground for children in each neighborhood and locating a space for parents to sit next to them. |
| 8 | Personal House (Ownership) | Providing ownership for residents that would give a sense of belonging and responsibility for the surrounding environment; providing conditions to be under the control of the Housing and Urban Development Department to help residents buy the units |
| 9 | Personal Terraces Overlooking Streets | Providing a visual contact between the terrace and the street on the external edges of the building; establishing the terrace to overlook the street but not to be viewed by the pedestrians. |
| 10 | Windows Overlooking Life | Locating the windows with an appropriate view and landscape (green spaces, natural landscapes facing the street) by observing the privacy and comfort of the residents |
| 11 | Semi-Open Walls | Providing the relationship between closed spaces through semi-open spaces; not separating all the space from the wall; providing a spatial relationship between parts of the house through the semi-open wall or internal windows. |
| 12 | Rejuvenating Areas (Locating Building Construction) | Not constructing the building in beautiful areas; constructing the building to face beautiful areas to help utilize charming scenery and reduce environmental degradation; keeping northern parts of the building empty |
| 13 | Fruit Trees | Preserving old trees and trees compatible with the regional climate (fruit trees in central courtyards, especially citrus fruits obtained from local trees of this region, as well as deciduous trees on the margin of the blocks); placing seating places under the trees; planting trees on either side to define the axes, etc. |
| 14 | Four-Story Buildings (Fig. 3) | Shortening the distance between the resident and the ground for as high as a three-story building |
| 15 | Animals | Keeping animals like poultry (hens and roosters) in the central courtyard, as well as ducks on the margin of water streams to help children interact with animals |
| 16 | Vegetable Gardens | Supplying and preserving fresh vegetables for the residents in the central courtyard and protecting them |
| 17 | Sunlit Places | Finding a space with the most sunlight (inside the green central courtyard, a place between the building and external spaces) to serve as a place for growing vegetables and for residents to sit |
| 18 | External Rooms | Providing a sunlit space and extending fences and railings around it towards a green landscape to utilize the landscape; providing a space for residents to sit. |
| 19 | Illumination from two Directions | Establishing spaces to better utilize the sun in a way that the two directions of the house receive sunlight |
| 20 | Residential Complexes (Buildings Harmonization) | Considering the differences and similarities in buildings in different blocks |
| 21 | The Place for the Passage and Parking of Bicycles | Designing a bicycle path on the margin of each block in a way it is separated from the street and the sidewalk; locating these paths on a sunlit side of the units to be aligned with the pedestrian zone through a lower surface; placing a parking lot for bicycles on the ground floor near the complexes' parking |
| 22 | House for a Small Family | Creating three realms of privacy in the house: One realm for parents through a separated bedroom; another for children through separated bedrooms, and the other as a shared place between the dining room and the kitchen to establish a relationship between these two realms |
| 23 | A House for Young Couples | Separating the house into two sections: the private section (bedrooms) and the semi-private section (the dining room and the kitchen) |
| 24 | Single House | Creating single-bedroom units; and establishing a relationship with other units through collective spaces such as lobbies to protect sociability. |
| 25 | Main Entrances (Fig. 4) | Providing Pirneshin ¹ on the two sides of the entrance and placing vases directing to the entrance via creating split levels above the ground through stairways |

| | Patterns | Solutions |
|----|----------------------------------|--|
| 26 | Private Space | Preventing the overlooking of the private space utilizing spatial separation and spatial arrangement orders |
| 27 | Personal Room | Dedicating a personal room to each member of the family |
| 28 | Central Kitchen | Enlarging the kitchen and creating the relationship between it and the dining room; placing a breakfast space and terraces to relate to the kitchen to store foods that need sunlight |
| 29 | Rooftop Gardens | Using vases on the edges of the terraces and using green walls on sunlit angles; using creeping vines around the rooftop spaces. |
| 30 | Courtyards Full of Life (Fig. 5) | Creating a central courtyard and engaging neighbors and children in this space; creating a visual contact with these spaces through units' terraces. |
| 31 | Living Rooms | Providing circular furniture facing the TV to help create contact with the terrace space |
| 32 | Balcony | Creating a sunlit space facing the street free from isolation with a controlled view from the outside to the inside of the building; creating a space for people to sit; stretching part of the balcony to the inside of the building (backward); equipping the space to be used in different seasons. |



Fig. 2. Main Gateways



Fig. 3. Four-Story Buildings



Fig 4. Courtyards Full of Life



Fig 5. Courtyards Full of Life

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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 writing the article. The first author contributed to the writing of the article and the methodology section by 40%, while the second author contributed to the writing of the article, collection, and analysis of the data, and the conclusion section by 60%.

ENDNOTE

1. Specific Places for the Elderly to in Front of the Entrance Doorway

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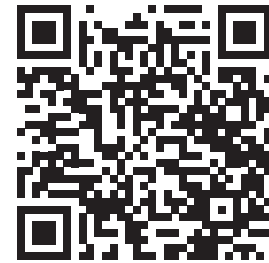
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