

# Analyzing the Physical Components of the living Environment Effective in Promoting Social Solidarity in Residential Complexes; Case study: Sobhan and Golha Residential Complex in Tehran

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## ABSTRACT

The role of individuals in space becomes significant when various events are anticipated and organized according to the environmental context. Humans are inherently social beings, and their survival has always relied on interaction, solidarity, and communication with one another. The present study aims to identify the spatial capabilities and physical components of the environment to develop design principles for residential complexes that effectively promote residents' sense of social solidarity and encourage social interactions. Ultimately, the goal is to present a sufficient model for designing residential complexes that enhances social solidarity. To achieve this, data were collected through a questionnaire that demonstrated appropriate reliability and validity, alongside the Delphi technique. Data analysis was conducted using descriptive and inferential statistics with SPSS and AMOS software. The results of the structural model revealed a path coefficient of 0.87 between the two variables "social solidarity" and "quality of the physical environment", indicating a positive moderate relationship. Additionally, the analysis identified strong connections among the four latent variables: social solidarity, sociability, quality of the physical environment, and social interactions. Consequently, one can conclude that improving the quality of the physical environment in residential complexes fosters residents' inclination to engage in that setting and participate in both individual and social activities. The final research model, derived from standard coefficients in AMOS software, demonstrated a significant direct effect of the physical environment (with a path coefficient of 0.81) on the formation and enhancement of social solidarity. Furthermore, the quality of the physical environment in residential complexes has the most substantial impact on strengthening residents' social solidarity, as indicated by a path coefficient of 0.96. In general, the results suggest that improving the physical components and overall quality of residential spaces can significantly foster social interactions, sociability, and a sense of belonging among residents.

**Keywords:** Residential Complexes, Social Solidarity, Social Interactions, Physical Variables.

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## 1. INTRODUCTION

Humans are inherently social beings, and their lives have always relied on interaction, solidarity, and communication. Social solidarity refers to the connection that shapes an individual's identity in relation to their environment and their sense of existence. When this solidarity is established, social interactions occur more effectively in shared space. Developing and promoting social solidarity reflects the stability of a society's character. Social interaction can take various forms, such as eye contact, conversation, or other forms of communication between individuals. This interaction necessitates the definition of appropriate events and activities, which in turn fosters active participation among individuals in spaces. Many theorists argue that the quality of social interaction is crucial for individuals to feel attached to their living environment. Consequently, the success of social solidarity in a public space is directly related to human presence and engagement with that space. Therefore, architecture and urban planning should focus on enhancing human interaction and solidarity (Taghipour and Soltanzadeh 2015). Residential complexes are particularly significant as their spatial characteristics can greatly influence the promotion of social solidarity within the context of urban structures. Poorly designed complexes, due to a lack of attention to human needs- especially those related to social interactions- have led to challenges in the personal and social lives of residents (Yazdani and Teimori 2012). As a result, residential settings

can serve as effective places for fostering social solidarity, and investing in these areas is likely to yield positive outcomes (Behzadfar 2012). Considering the growing importance of social interactions and the need to focus on human factors in the design of residential environments, previous studies have primarily examined general concepts of social solidarity or evaluated spatial characteristics, without providing specific, practical models for enhancing social solidarity. The innovation of the present study is that it provides a practical and appropriate model for the design process of these complexes by accurately identifying the physical components affecting social solidarity in residential complexes. This study combines theoretical and empirical approaches and utilizes advanced statistical analyses to model a significant relationship between physical factors and the level of social solidarity. Accordingly, the primary research question is: "What physical components affect social solidarity in residential complexes?" The research hypothesis suggests that factors such as diversity, legibility, use of nature, environmental security, spatial attractiveness, and eventuality in the design of high-rise residential complexes can enhance the sense of social solidarity. Therefore, there is a significant relationship between the physical components of the environment and the sense of social solidarity, enabling the development of a predictive relationship model between these components.

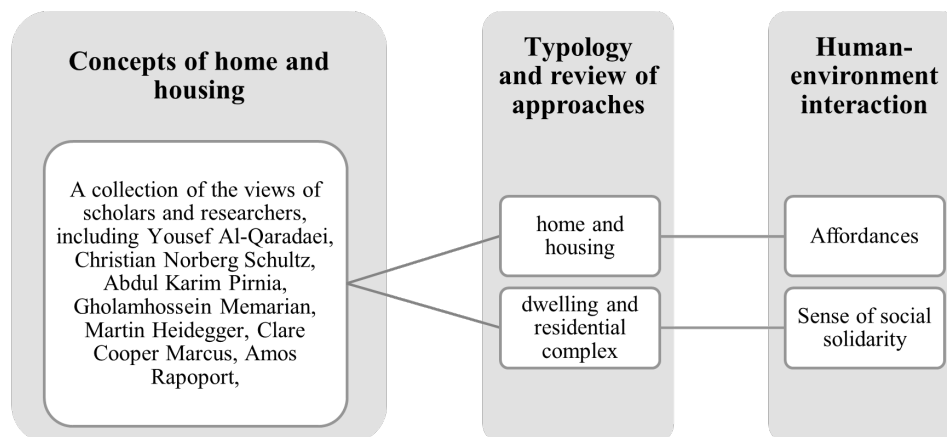


Fig. 1. Content Structure of the Research

## 2. THEORETICAL FOUNDATIONS OF THE RESEARCH

Intellectual and epistemological changes in the late twentieth century have transformed how humans perceive their place and presence in the world. This shift in attitude has prompted a reevaluation of the concept of dwelling and the way in which people live, particularly in contemporary architecture. In this

context, various qualitative dimensions have been considered, such as how humans interact with space and the need to create environments that align with their needs. The fusion of philosophical perspectives and scientific approaches to humans in the modern era has provided a foundation for reexamining and reinterpreting the capacities of the built environment to address existential needs and improve the quality of habitation. However, less attention has been paid

to religious teachings and metaphysical concepts related to habitation have received less attention in discussions of environmental thought and design, due to their immaterial nature (Taheri 2012). The concept of dwelling possesses an intrinsic and fundamental quality, deeply connected to human existence. In Persian, the terms “daroun” (inside in English) and “tou” (within in English) not only refer to the interior of a house but also to a person’s inner self. These terms illustrate the relationship between a home, the individual, and his/her inner self. Accordingly, dwelling can be seen as an invitation to reconnect with one’s inner self. However, realizing this sense of dwelling requires a connection between the interior and the exterior; from the inside, one must be able to observe and engage with the outside world (Taheri 2012). The process of dwelling reflects an individual’s identity and emotional connection to their environment, ultimately fostering a sense of belonging to a place (Mirzaali and Razmi 2015). In his book “Architecture, Meaning, and Place,” Christian Norberg-Schulz emphasizes that an environment becomes social and meaningful when it offers rich opportunities for shaping identity.

According to Schulz, the architect’s task is to design spaces that provide a sense of security and peace (Schulz 2003). He believes that dwelling extends beyond merely having a roof and physical area; it involves establishing a profound connection with the environment, including all its levels, and considers settling as synonymous with attachment to a place (Schulz 2023). Heidegger places emphasis on the concept of dwelling from a phenomenological perspective. He highlights the connection between dwelling and being, asserting that both thinking and building are integral to the experience of dwelling (Taheri 2013). For Heidegger, dwelling is a fundamental characteristic of the universe, and the act of settling transforms our presence into a personal and social world, ultimately creating a home (Partovi 2015). Accordingly, dwelling emerges as a transmaterial concept linked to the formation of deep and meaningful relationships between individuals and their environment, fostering a bond between humans and space. Heidegger’s call to reflect on the concept of dwelling serves as a reminder of the often-overlooked dimensions of the human experience of settlement on Earth.

**Table 1. The Concepts of Dwelling and Home from the Perspective of Iranian and Foreign Researchers**

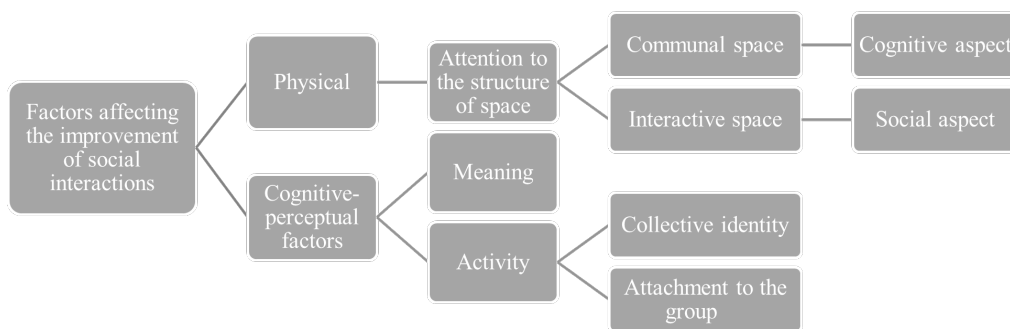
Concept	Researchers
Meeting Physical, Emotional, and Spiritual Needs	Pourdihimi, 2001; Akhvat et al., 2011; Zakerizadeh, 2013; Pourmohammadi, 2014; Oliver, 2007
Need for Shelter	Pirnia, 2005; Sartipipour, 2011; Pourmohammadi, 2014; Bachelard, 1994
Link between Life, Family, and Environment	Sartipipour, 2011; Yazdani & Ebrahimi, 2012; Najafpour & Shafieiyon, 2014; Raheb, 2015; Rapoport, 1969; Norberg-Schulz, 1978; Jung, 1980
According to Culture and Social Customs	Zakerizadeh, 2013; Hashemnejad & Sharifian, 2014; Mirzaali & Razmi, 2016; Yooni, 1965; Rapoport, 1969; Jung, 1980; Oliver, 2007
Achieving Peace and a Sense of Belonging	Taheri, 2013; Raheb, 2015; Haeri Mazandarani, 2016; Hanif, 2018; Norberg-Schulz, 1978; Bachelard, 1994; UNESCO, 1997
Synonymous with being and a Symbol of Self	Heidegger, 1935; Cooper Marcus, 1999
Dependent on the Physical Environment and Environmental Conditions	Alexander, 1978; Vestooi, 2006
Privacy of the Personal, and Defensible Space	Lang, 1987

Public areas in residential environments are integral to the communal life of residents and facilitate their group use. These spaces serve as a platform for residents’ social activities and interactions, impacting the overall functionality and character of residential buildings. Therefore, architecture, society, and culture are closely interconnected within these environments. As mass residential complexes expand, the significance of public spaces and their usage has become increasingly important. In these settings, social interaction and relationships among individuals who necessarily gather in one place are crucial to the quality of life. Experiences from the twentieth century have shown that architects often lack a thorough

understanding of the function of public spaces, which can diminish the efficiency and quality of residential environments. Thus, examining the role of public spaces in residential complexes, especially from physical and architectural perspectives, is essential for assessing the quality of these environments. Unfortunately, these aspects have frequently been overlooked, despite their vital role in ensuring the security of the environment and enhancing how residents utilize their surroundings (Ghaedi 2014). To address relevant issues, it is necessary to define what constitutes residential complexes. A residential complex can consist of various types of housing, including single-family homes, low-rise apartments,

mid-rise apartments, and high-rise towers. Designing such a complex involves more than merely organizing similar building blocks; it requires a comprehensive and thoughtful approach to its spatial layout and livability. This process includes creating a spatial enclosure, providing quality open space, and arranging buildings and urban areas in an aesthetically pleasing manner. The configuration of blocks and the spacing between them are crucial factors, as they affect lighting, accessibility, parking, open and green spaces, and the connection between open spaces and blocks. In addition, open areas should be designed to accommodate specific concepts and functions, such as public gathering places, gardens and green spaces, playgrounds for children, and pathways for walking

and cycling (Amini et al. 2013). In the context of social interactions, key concepts such as neighborhood, casual social encounters, social participation, and social support are significant. “Neighborhood” refers to the interactions among residents living in the same block or vicinity, while informal social contact may occur between individuals who do not know each other or are not neighbors. Social participation involves interactions centered around community-related issues, whereas social support pertains to friendship networks and small groups that nurture a sense of care and belonging. Such interactions enable residents to familiarize themselves with one another, thereby reinforcing a sense of belonging to a larger community (Kim and Kaplan 2004).



**Fig. 2. Factors Affecting the Improvement of Social Interactions**

(Lashgari and Soheili 2022)

Based on the theory of sociable and unsociable environments, Stephen Hall has examined the factors affecting social interaction. These factors include the potential for face-to-face contact, the reduction of interaction distances in movement, and pauses for consultative social distances. Similarly, Osco and Goske argue that social solidarity creates an identity relationship between individuals and their physical and social environment, providing a sense of “existence”. They identify components such as movement speed, scale, directions, and environments for social interaction as significant factors affecting the degree and frequency of interactions (Lashgari and Soheili 2022). The impact of these effects is so profound that John Lang asserts that when people feel attached to spaces and environments, social interaction occurs at its highest levels (Lang 2002). The phenomenological perspective examines broader aspects of the relationship between humans and their environment. This approach includes examining how individuals behave differently in response to similar factors and understanding the reasons behind these behaviors. Phenomenology emphasizes personal experiences and individual perceptions, analyzing human behavior as influenced by a set of external and internal factors, including mental and cultural backgrounds. The individual’s motivational force drives behaviors that actualize their potential abilities

and foster growth beyond their current situation. This approach rejects any form of determinism, whether psychological, biological, social, or economic, in behavior and underscores human freedom in decision-making and action.

Numerous studies have been conducted on the concept of “affordances” in the environment and ecology. James Gibson, an ecological psychologist educated at Princeton University, posits that the environment, with its meaningful characteristics, provides creatures with the affordances necessary to perform actions—both desirable and undesirable (Gibson 2015). In essence, the meaning or value of the environment is defined by the affordances it offers. Some affordances are inherent, while others are perceived through experience and attention. Affordances represent the semantic and functional characteristics of both physical and social environments, formed through the interaction between humans and their environment. The physical aspects of the environment play a crucial role in promoting collective life. By engaging with the complexities of the environment, observers become mentally involved, leading to increased communication and interaction. Conversely, a monotonous environment lacks the appeal necessary for pausing, attention, and contemplation, resulting in diminished social interaction. Since visual interaction is the first degree of engagement in the environment,

enhancing complexity and contrast can significantly boost interaction (Arbabzadegan Hashemi and Ranjbar 2009). By creating gathering places, urban public spaces foster citizens' enjoyment of nature and social activities, proving effective in improving the quality of life, conveying urban history and culture, and cultivating a sense of belonging and identity. The physical elements and characteristics of the environment are fundamental in establishing and developing social relationships, both simply and complexly. Objective criteria such as functional quality, activity, permeability, and accessibility directly relate to and influence social interactions (Behzadfar and Tahmasbi 2013). In general, designing

effective public spaces that attract diverse individuals and groups requires several key factors: a defined territory, security, integrated structure, continuity and clarity, predictability, appropriate facilities, responsiveness to needs, physical comfort, sufficient information, and environmental attractiveness. All these factors contribute to the formation of social interactions (Nesari et al. 2016). Based on a review and analysis of domestic and foreign research on the environmental factors affecting social solidarity, effective physical components have been identified, as presented as a conceptual model of the theoretical foundations of the research in Fig.3.

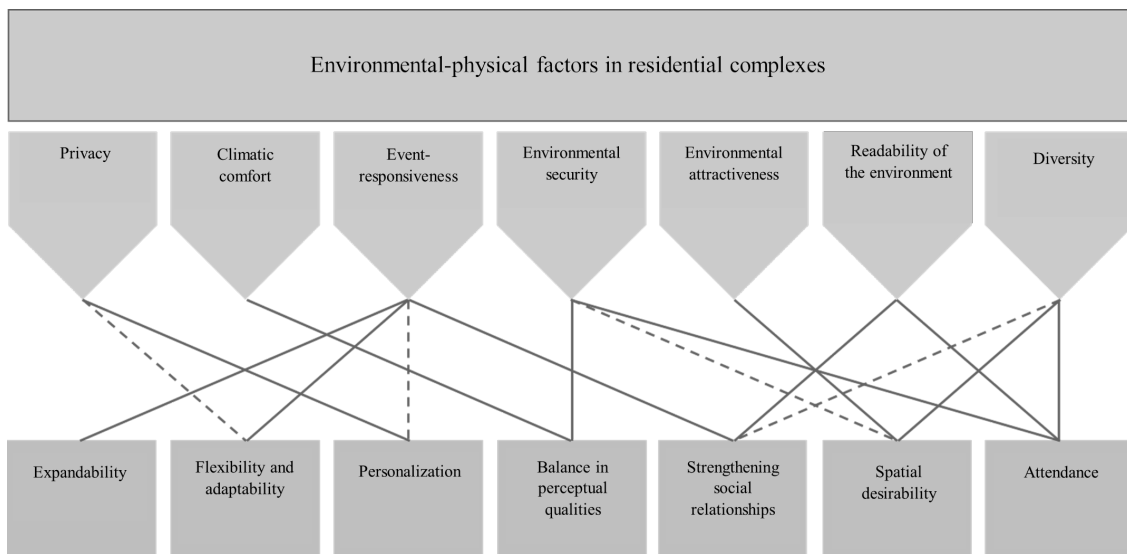


Fig. 3. Conceptual Model of the Research

### 3. RESEARCH METHODOLOGY

The present study is descriptive-analytical research that employed quantitative and survey methods. It aims to identify the physical factors that contribute to improving social solidarity and enhancing sociability, as well as the resulting social interactions within residential complexes. For this purpose, the Delphi technique was initially utilized to identify and extract components and indicators related to the

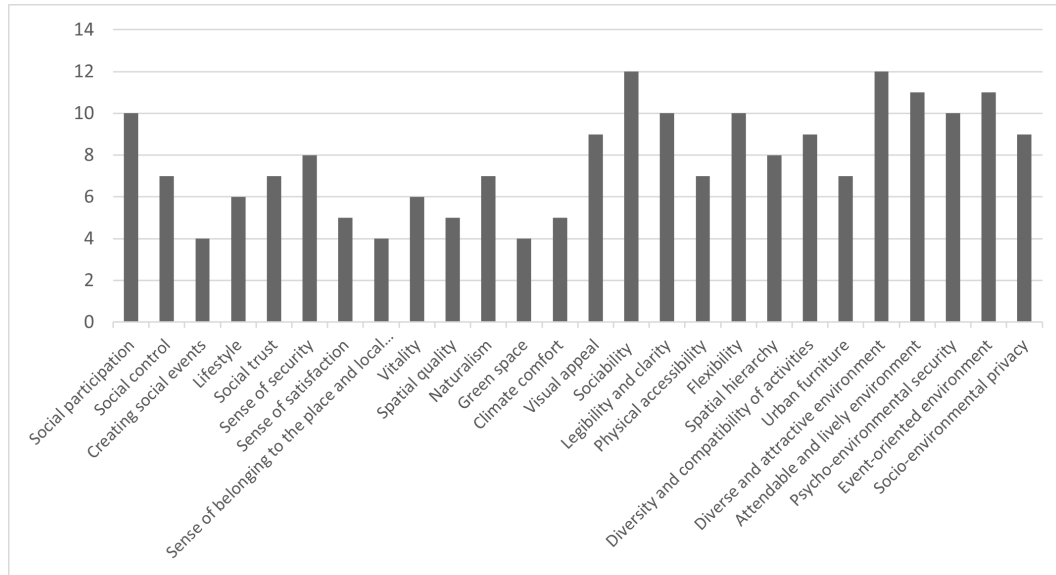
physical environment, social solidarity, and social interactions in residential complexes. Next, the data were gathered through a field survey. The researcher directly posed questions to the statistical population using standardized questionnaires to gather the required data for structural modeling. The statistical population included 28 residents from two residential complexes, "Sobhan" and "Golha", located in Tehran. The collected data were analyzed using SPSS 26 and AMOS 24 software.

Table 2. Classification of Indicators Affecting Social Solidarity

Component	Indicators
Sociocultural	Social participation - social control - creation of social events - lifestyle - social trust - social interactions - social privacy
Semantic-Cognitive	Sense of security - Sense of satisfaction - Sense of belonging to the place and local community - Vitality - Spatial quality - Psychological safety
Physical-Environmental	Naturalism - Green space - Climate comfort - Visual appeal - Diverse and attractive environment - Attendable and lively environment - Event-oriented environment
Functional	Sociability - Legibility - Physical accessibility - Flexibility - Spatial hierarchy - Diversity and compatibility of activities - Urban furniture

The components affecting social solidarity, extracted from Persian and English sources and based on the opinions of experts and scholars, were classified in a systematic and four-part structure. Table 2 presents the identified components along with their corresponding

indicators. Figure 1 illustrates the frequencies of these indicators. Next, within each category, the components that exceeded the average frequency were selected and highlighted as the most significant factors affecting social solidarity, as shown in Table 3.



**Fig. 4. Frequency of Indicators Affecting Social Solidarity**

**Table 3. The most Significant Indicators Affecting Social Solidarity**

Component	Indicators
Sociocultural	Social - Social Privacy
Semantic-Cognitive	Vitality - Spatial Quality - Psychological Safety
Physical-Environmental	Climate Comfort - Diverse and Attractive Environment – Event-oriented Environment
Functional	Sociability - Legibility - Social Interactions

To investigate the level of social solidarity among different social classes, two residential complexes in Tehran, Sobhan and Golha (see Figs 5 and 6), were chosen as case studies. The aim of designing

and constructing these projects is to attract residents and foster conditions that encourage greater social interactions.



Fig. 5. Sobhan Residential Complex



Fig. 6. Golha Residential Complex

To investigate neighborhood relationships and social solidarity within the selected complexes, we designed a questionnaire divided into three sections. The first section focuses on gathering personal information

from residents, highlighting the diversity of individual characteristics. This includes factors such as gender, marital status, education level, religion, age, average monthly income, length of residence in the complex,

and type of housing ownership.

The second section focuses on interactions among residents and neighborhood relations. This section is further divided into three subsections to explore various aspects of social communication. The third section assesses residents' satisfaction with the factors influencing social interactions, which have been drawn from previous studies and categorized accordingly.

#### 4. RESEARCH FINDINGS

This section discusses the perspectives of 28 residents

gathered through semi-structured interviews. During these interviews, we aimed to analyze the participants' ideas and opinions in a detailed and in-depth manner. The information obtained was reviewed and critically assessed, leading to the creation of a list of concepts that was presented to the residents in the form of a questionnaire. Following this, axial coding was conducted, with each continuum receiving an assigned title. Finally, by pairing these continuums, we extracted 28 axial codings, the titles of which are presented in Table 4.

**Table 4. Concepts Resulting from Axial Coding**

Concepts Resulting from Axial Coding	Horizontal Continuum	Vertical Continuum
Diverse and Attractive Environment	--	1 - 7
Legible Environment	1	8-13
Attendable and Lively Environment	2, 8	14-18
Psycho-Environmental Safety	3, 9, 14	19-22
Climatic-Environmental Comfort	4,10,15,19	23-25
Event-Oriented Environment	5, 11, 16, 20, 23	26 and 27
Socio-Environmental Privacy	6, 12, 17, 21, 24, 26	28
Socio-Environmental Interactions	7, 13, 18, 22, 25, 27, 28	--

##### 4.1. Reliability of the Second-Step Instrument: Cronbach's Alpha of the Questionnaire

In this section, Cronbach's alpha coefficient was used to measure the reliability of the questionnaire.

After conducting the pre-test, the Cronbach's alpha coefficient was obtained as 0.983, indicating a very high reliability of the questionnaire. The detailed results of this section are presented in Table 5.

**Table 5. Verification of the reliability of research questionnaires (Cronbach's alpha calculation)**

Number of questions	Cronbach's alpha	Research step
96	0.983	Questionnaire for residents

To evaluate the acceptance of the indicators in the measurement models, each model was drawn and calculated separately. The results, as shown in the table below, indicate that the measurement models have a good fit. In other words, the overall indices

demonstrate that the data strongly support the models. Since the factor loadings are above 0.5 in most cases and the P-value for all items is zero, we can conclude that these items effectively assess the data.

**Table 6. Verification of the Reliability of Research Questionnaires (Cronbach's Alpha Calculation)**

Index	Diverse and Attractive	Legible	Attendable and Lively	Psychological Safety	Climate Comfort	Event-Oriented	Social Privacy	Social Interactions	Desirable Value	Status
Chi-Square	8.92	141.32	8.32	241.87	231.63	701.48	119.45	711.10	-	-
Root Mean Square	0.033	0.025	0.21	0.025	0.038	0.34	0.031	0.043	<0.05	Desirable
Comparative Fit Index	0.90	0.87	0.84	0.83	0.83	0.93	0.86	0.91	>0.90	Desirable
Incremental Fit Index	0.86	0.94	0.84	0.93	0.87	0.95	0.92	0.88	>0.90	Desirable

Index	Diverse and Attractive	Legible	Attendable and Lively	Psychological Safety	Climate Comfort	Event-Oriented	Social Privacy	Social Interactions	Desirable Value	Status
Goodness of Fit Index	0.59	0.63	0.54	0.57	0.51	0.55	0.59	0.62	>0.50	Desirable
Root Mean Square Error	0.077	0.067	0.078	0.064	0.062	0.076	0.065	0.043	<0.1	Desirable
Normalized Chi-Square	2.32	2.43	2.50	2.84	3.12	1.81	2.65	2.02	Between 1 and 3	Desirable

After entering the data into SPSS software, the adequacy of the sample size was examined. A Kaiser-Meyer-Olkin (KMO) statistic value greater than 0.7 indicates that the existing correlations are suitable for factor analysis and confirms the adequacy of the sample size. In this study, two factor analyses were

conducted, one of which focused on the residents' questionnaire. Table 7 presents the results of the KMO test and Bartlett's test of sphericity. The KMO value was found to be 0.807, which exceeds the threshold of 0.6, confirming the adequacy of the sample size.

**Table 7. KMO Test and Bartlett's Test of Sphericity for Examining the Adequacy of the First-Step Sample Size**

KMO	0.807
Bartlett's Test of Sphericity	708.123
Df	378
Sig	0.000

#### 4.2. Spearman's Correlation Coefficient

To investigate the correlation between the physical components of residential complex design and the

sense of social solidarity, we applied Spearman's correlation test. This test calculates a correlation coefficient that numerically represents the relationship between the two variables.

**Table 8. Correlation between each Component of the Residential Complex Design in Relation to Social Solidarity**

		Social Interactions	Environmental Appeal	Social Privacy	Legibility	Attendance	Environmental Security	Spatial Diversity	Eventuality	Social Control	Climate Comfort	Flexibility
Social Interactions	Spearman's Correlation	1.000	-.003	.137**	.133**	-.161**	.133**	.111*	.163**	-.043	.018	.069
	Sig.	.	.947	.006	.008	.001	.008	.027	.001	.389	.716	.166
Environmental Appeal	Spearman's Correlation	-.003	1.000	-.118*	-.026	-.024	-.055	.041	.025	-.184**	.043	.060
	Sig.	.947	.	.019	.604	.634	.271	.418	.616	.000	.387	.233
Social Privacy	Spearman's Correlation	.137**	-.118*	1.000	.036	-.027	.122*	.011	.042	-.033	.094	.056
	Sig.	.006	.019	.	.477	.594	.014	.831	.401	.514	.059	.262
Legibility	Spearman's Correlation	.133**	-.026	.036	1.000	.031	.054	-.040	.100*	.054	-.014	.082
	Sig.	.008	.604	.477	.	.534	.285	.428	.046	.282	.786	.099
Attendance	Spearman's Correlation	-.161**	-.024	-.027	.031	1.000	.058	.129**	.064	.188**	.062	-.028
	Sig.	.001	.634	.594	.534	.	.244	.010	.201	.000	.217	.571
Environmental Security	Spearman's Correlation	.133**	-.055	.122*	.054	.058	1.000	-.068	-.025	.160**	.063	.015
	Sig.	.008	.271	.014	.285	.244	.	.175	.622	.001	.209	.772
Spatial Diversity	Spearman's Correlation	.111*	.041	.011	-.040	.129**	-.068	1.000	.008	.062	.088	.078
	Sig.	.027	.418	.831	.428	.010	.175	.	.869	.216	.080	.121

		Social Interactions	Environmental Appeal	Social Privacy	Legibility	Attendance	Environmental Security	Spatial Diversity	Eventuality	Social Control	Climate Comfort	Flexibility
Eventuality	Spearman's Correlation	.163**	.025	.042	.100*	.064	-.025	.008	1.000	-.008	-.057	-.012
	Sig.	.001	.616	.401	.046	.201	.622	.869	.	.869	.256	.810
Social Control	Spearman's Correlation	-.043	-.184**	-.033	.054	.188**	.160**	.062	-.008	1.000	.075	.047
	Sig.	.389	.000	.514	.282	.000	.001	.216	.869	.	.136	.347
Climate Comfort	Spearman's Correlation	.018	.043	.094	-.014	.062	.063	.088	-.057	.075	1.000	.019
	Sig.	.716	.387	.059	.786	.217	.209	.080	.256	.136	.	.701
Flexibility	Spearman's Correlation	.069	.060	.056	.082	-.028	.015	.078	-.012	.047	.019	1.000
	Sig.	.166	.233	.262	.099	.571	.772	.121	.810	.347	.701	.

The results presented in the table above indicate a positive correlation between social interactions and several components, including social privacy, legibility, environmental security, spatial diversity, and eventuality. Additionally, similar positive correlations were found among other components: social privacy with social interactions and environmental security; legibility with eventuality; attendance with spatial diversity and social control; environmental security with social privacy and social control; and spatial diversity with attendance. Furthermore, some significant inverse correlations were also identified, such as between social interactions and attendance, as well as between environmental appeal and both social

privacy and social control. This suggests that an increase in one variable may lead to a decrease in the dependent variable. In general, it can be concluded that most of the components under study have a positive direct correlation with other components. Therefore, prioritizing these elements in the design of residential complexes could effectively enhance residents' sense of social solidarity. After the experts completed the questionnaires, the collected data were entered into SPSS software, and a conceptual relational model was created using AMOS software. The information obtained from SPSS was also incorporated into AMOS for structural analyses and model fitting.

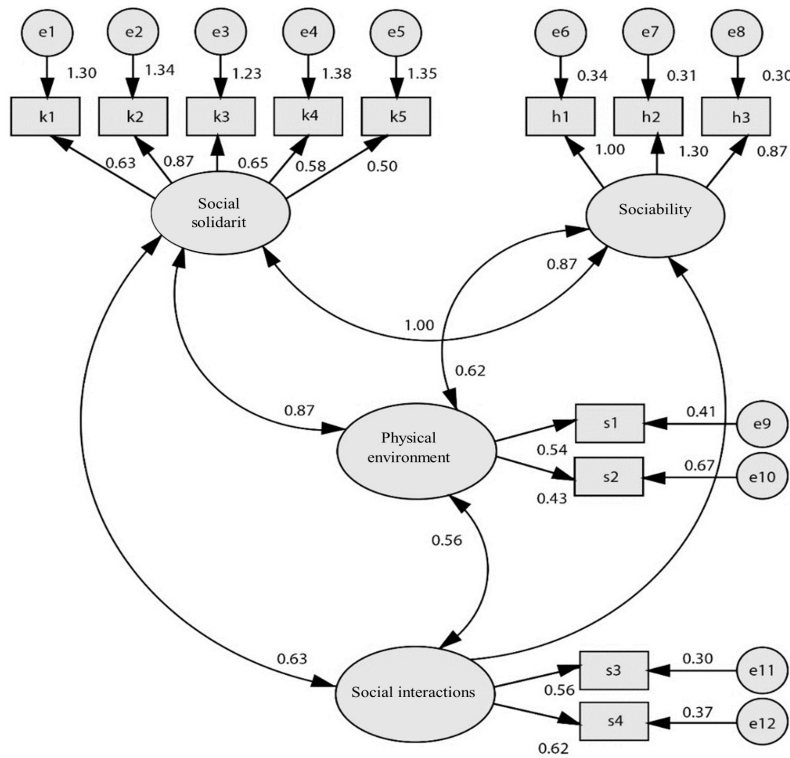


Fig. 7. Structural Equation Model of the Research Hypothesis

Chart 2 presents the conceptual model of the research along with the standard coefficients obtained using AMOS software. The values on the arrows represent the factor loadings of the regression relationships within the model, while the values inside the rectangles indicate the covariance coefficients of the observed variables. The coefficients on the arrows for the latent variables—namely, the physical environment, social solidarity, social interactions, and sociability—reflect the path coefficients for the relationships between these variables. As shown in Chart 2, two coefficients exceeded 0.50, indicating a strong and significant relationship between the respective variables, while the other relationships showed coefficients below 0.50. In this study, the physical environment was assessed using four items, resulting in a path coefficient of 0.81. This suggests that the physical environment has a direct and strong influence on fostering and enhancing social solidarity

among residents. Furthermore, the quality of the physical environment in the residential complexes studied had a very positive and strong effect on residents' social solidarity, with a path coefficient of 0.96. This high value underscores its importance, as it is close to one. The path coefficient between social solidarity and the quality of the physical environment was calculated to be 0.87, indicating a positive and moderate relationship between these two variables. In summary, investigating the relationships among the four latent variables revealed that the strongest connections in the structural model were observed between social solidarity and sociability, as well as between the quality of the physical environment and social interactions. Therefore, enhancing the quality of the physical environment in the design of residential complexes can significantly motivate residents to engage in both individual and social activities.

**Table 9. Fit Indices of the Structural Equation Model related to the Research Hypothesis**

Index	Value	Desirable Value	Status
Chi-Square	612,15	-	-
Root Mean Square	0.041	<0.05	Desirable
Comparative Fit Index	0.97	>0.90	Desirable
Incremental Fit Index	0.93	>0.90	Desirable
Goodness of Fit Index	0.58	>0.50	Desirable
Root Mean Square Error	0.067	<0.1	Desirable
Normalized Chi-Square	1.67	Between 1 and 3	Desirable

The primary research hypothesis examined the impact of social capital on social adaptation levels. Table 10 displays the overall fit indices of the structural equation model related to this hypothesis. The results

indicate that the model's fit indices are at a desirable level, suggesting that the model aligns well with the research data.

**Table 10. General Fit Indices of the Structural Equation Model related to the Research Hypothesis**

Hypothesis	Regression Coefficient	Critical Value	P	Result
Physical Environment → Social Solidarity	0.961	18.731	0.0000	Confirmed
Physical Environment → Sociability	0.945	17.420	0.00	Confirmed
Physical environment → Social Interactions	0.932	17.126	0.00	Confirmed

The results presented in Table 10 indicate that the normalized effect size for the main research hypothesis is 0.961, with a P-value of 0.000. These findings support the primary research hypothesis, demonstrating that the physical environment significantly influences the level of social solidarity among residents in residential complexes. Therefore, it can be concluded that enhancing the quality of the physical environment can effectively promote social solidarity among residents.

## 5. CONCLUSION

As the population increases and resources become scarcer, competition for access to these resources pushes individuals to specialize in various jobs, leading to an expanded division of labor within societies. This process results in two distinct types of societies: simple, primitive societies and advanced, modern societies. The quality of these societies is assessed based on their collective conscience. In primitive societies, this collective conscience is

stronger, whereas in modern or organic societies, it tends to be weaker. When the division of labor occurs in societies lacking an internally institutionalized norm of progress, it can lead to social unrest. Therefore, until equality and justice are established, it is challenging to implement a fair division of labor. In a diverse society like Iran, which encompasses a variety of identities, ethnicities, cultures, languages, and religions, maintaining social solidarity is crucial. Strengthening social solidarity can facilitate effective strategies to address the factors that threaten it, ensuring peaceful coexistence among individuals while also benefiting from urban development. Such coexistence can enhance unity, empathy, and social progress, preventing issues such as abnormalities, delinquency, crime, and social disintegration. This study aimed to answer the question: "What physical components affect social solidarity in residential complexes?" Two residential complexes, Sobhan and Golha in Tehran, were chosen as case studies, and a researcher-developed questionnaire was distributed among their residents. The study's findings revealed that interactions among residents primarily consist of recognizing neighbors by name and engaging in brief conversations, with continuous interactions occurring less frequently. This aligns with previous research by Brophy & Smith (1997), Brewer (2009), and Bertmann et al. (2013), which described social interactions in residential environments as superficial and limited. The study identified various components—such as social privacy, social interactions, environmental

security, legibility, eventuality, attendance, spatial diversity, and social control—that directly and indirectly influence the quality of the physical environment. The results indicated that enhancing the quality of the physical environment in residential complexes increases residents' motivation to engage in individual and social activities. Additionally, there was a positive relationship with a path coefficient of 0.87 between social solidarity and the quality of the physical environment, indicating a moderate correlation. Among the four latent variables in the study, the strongest relationship in the structural model was found between social solidarity and sociability, as well as between the quality of the physical environment and social interactions. To promote social solidarity in residential complexes, the following suggestions are proposed:

1. Design spaces that facilitate collective activities for residents.
  2. Allow residents to participate in management decisions.
  3. Enhance facilities and welfare services.
  4. Develop and enforce appropriate management regulations.
  5. Implement measures to increase residents' sense of belonging to their living environment.
  6. Promote proximity and spatial integration among different social classes.
- Implementing these measures can strengthen social solidarity, reduce social anomalies, and enhance the overall quality of urban 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.

## REFERENCES

- Abdulla, Aldrin, Mohd Najib Mohd Salleh, and Siti Rasidah Md Sakip. 2012. Fear of crime in gated and non-gated residential area. *Social and Behavioral Sciences* 35: 63-73. <https://doi.org/10.1016/j.sbspro.2012.02.063>
- Alexander, Christopher, Sara Ishikawa, and Murray Silversteing. 1977. *A Pattern Language*. Oxford University Press.
- Amini, Saba, Seyed Baqer Hosseini, and Saeed Norouzian Maleki. 2013. "Comparative Study of Residents' Satisfaction in Two Mid- and High-Rise Residential Complexes: Case Studies of Shahid Mahalati and Sobhan Residential Complexes." *Arman-Shahr Architecture and Urbanism* 6(11): 1-13. [https://www.armanshahrjournal.com/article\\_33461.html?lang=fa](https://www.armanshahrjournal.com/article_33461.html?lang=fa). [in Persian]
- Arbabzadegan Hashemi, Seyed Alireza, and Ehsan Ranjbar. 2009. "Revisiting the Concept of Contrast in Enhancing Visual Diversity of Public Urban Spaces: Case Study of Baharestan Square. Tehran." *Arman-Shahr Architecture and Urbanism* (3): 49-56. [https://www.armanshahrjournal.com/article\\_32591.html](https://www.armanshahrjournal.com/article_32591.html). [in Persian]
- Bazrafkan, Kāveh, and Maryam Gachkou. 2011. "The Role of Public Spaces in Shaping Social Interactions for Creating Social Sustainability in Cities." *National Conference on Civil Engineering, Architecture, Urbanism, and Energy Management*. <https://civilica.com/doc/145163>. [in Persian]
- Behzadfar, Moštafa, and Arsalān Tahmasbi. 2013. "Identification and Evaluation of Factors Influencing Social Interactions and Strengthening Civic Relations in Urban Streets: Case Study of Sanandaj." *Scientific-Research Journal of Art, Architecture, and Urbanism, Nazar* 10(25). [in Persian]
- Bonaiuto, M., F. Fornara, and M. Bonnes. 2006. Perceived Residential Environment Quality In middle- And low-Extension Italian Cities, *Revue Européenne de Psychologie Appliquée, European Review of Applied Psychology* 56(1): 23-34.
- Canter, David V. 1977. *The Psychology of place*. London: Architectural Press.
- Einifar, A., and A. Agha Latifi. 2011, Territory concept in residential complexes, comparative study of two residential complexes on surface and in height in Tehran. *Honarha-Ye-Ziba* 47: 17.
- Feštinger, L. A., S. Schachter, K. Back. 1950. *Social pressures in informal groups*. New York: Harper & Row.
- Ghaedi, Abdolkarim. 2014. "Capability of Public Spaces in Residential Complexes." *Soffeh* 24(67): 23-32. [in Persian]
- Groter, Jörg. 2004. *Aesthetics in Architecture*. Translated by Jahanshah Pakzad and Abdolreza Homayoun. Tehran: Shahid Beheshti University Press. [in Persian]
- Jacobs, J. 1961. *The dead and life of great American cities*. New York: Random House.
- Kim, Joongsub, and Rachel Kaplan. 2004. Physical and psychological factors in sense of community: new Urbaništ Kentlands and nearby Orchard village. *Environment and behavior* 36(3): 313-340. <https://doi.org/10.1177/0013916503260236>
- Kyungkim, S. 2006. The gate community: residents crime experience and perception of safety behind gates and fences in the urban area. Ph.D. Thesis, Texas A & M University.
- Lang, John. 2002. *Creating Architectural Theory*. Translated by Alireza Eini-Far. Tehran: University of Tehran Press. [in Persian]
- Lashgari, Farnaz, and Jamaledin Soheili. 2022. "The Role of Social Interactions in Creating Environmental Security in Residential Complexes: Case Study of Phase One of Ekbatan Town, Tehran." *Amayesh-e Mohit Journal* 15(59): 69-92. [https://journals.iau.ir/article\\_700067.html](https://journals.iau.ir/article_700067.html). [in Persian]
- Minnery, J. R., and B. Lim. 2005. Measuring crime prevention through environmental design. *Journal of Architecture and Planning Research* 22(4): 330.
- Mirzaali, Mohammad, and Hamidreza Razmi. 2016. "Exploring the Concept of Dwelling in Iranian-Islamic Culture and Architecture." *Third International Conference on Research in Science and Technology, Berlin*. [in Persian]
- Nasari, Bente Alhadi, Abdolhamid Ghanbaran, and Arash Nadami. 2016. "The Effect of Security on Sociability of Open Spaces in Residential Complexes in District 2 of Ilam." *Environmental Studies Haft-Hesar* 5(18): 101-116. <https://haftesar.iauh.ac.ir/article-1-272-fa.html>. [in Persian]
- Nemāni, Mitra. 2015. Physical Design of Residential Complexes to Improve Quality of Social Interactions. Master's thesis, Islamic Azad University, Marvdasht Branch. [in Persian]
- Norberg-Schulz, Christian. 2003. *Meaning and Place in Architecture*. Translated by Vida Norouz Barazjani. 4th ed. Tehran: Jan-Jahan. [in Persian]
- Oliver, P., and A. Bridge. 2007. *Atlas of vernacular architecture of the world*. Routledge.
- Partovi, Parvin. 2015. *Phenomenology of Place*. 3rd ed. Tehran: Academy of Arts. [in Persian]
- Ragheb Esfahani, Hossein ibn Mohammad. 1995. *Translation and Research of Quranic Vocabulary: Linguistic and Literary Interpretation*. Translated by Gholamreza Khosravi Hosseini. Tehran: Morteza. [in Persian]

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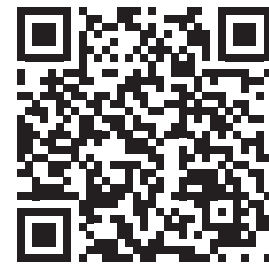
- Rapoport, Amos. 2013. *The Meaning of the Built Environment*. Translated by Farah Habib. Tehran: Urban Planning & Processing Company. [in Persian]
- Rasoulzadeh, Farzan, Azadeh Shahcheraghi, and Alireza Bandarabad. 2019. "Proposing a Model of Social Capital and Architecture in Residential Complexes Based on Social Construction." *Sustainable Architecture and Urbanism* 7(1): 197-216. <https://doi.org/10.22061/jsaud.2019.5758.1557>. [in Persian]
- Rong, Z. 2010. Improvement and recitalization of public spaces in the historical centre of macao towards the creation of a new sustainable urban environment: Jiangnan University, China.
- Salehi, Esmaeil. 2008. *Environmental Characteristics of Safe Urban Spaces*. 1st ed. Tehran: Urban Studies and Architecture Research Center. [in Persian]
- Sharehpour, Mahmoud. 2016. "Right to the City and Urban Public Spaces." *Cultural Heritage and Tourism Research Institute* 2(1): 51-66. <http://pc.richt.ir/article-4-258-fa.html>. [in Persian]
- Taheri, Jafar. 2013. "Rethinking the Concept of Dwelling in Architecture." *Iranian Architectural Studies* (4): 5-22. [in Persian]
- Uni, K. R. 1965. *Social factors in housing, The rural habitat*. Editors: David Oakly, K.Ramman. New Delhi: UNNI, The School of planning & Architecture.
- Yazdani, Samira, and Siavash Teimouri. 2013. "Effect of Open Spaces in Residential Complexes on Increasing Social Interactions of Residents: Case Study of Three Residential Complexes in Isfahan." *City Identity* 7(15): 83-93. <http://noo.rs/3kZSh>. [in Persian]
- Zucker, Paul. 1970. *Town and square from the agora to the village green*. England: The MIT Press.

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