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# Measuring Social Resilience of Dilapidated Urban Texture Using Structural Equation Method (Case Study: Tehran's District 15)

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**Abstract**

Due to decrepit buildings, urban decay, and poor accessibility, dilapidated urban textures in central urban areas have become vulnerable to natural disasters and man-made activities (Ilanlou & Bani-Saeid, 2023). For this, supporting the community residing in the environment will effectively reduce risks and damages (Sadeghlou et al., 2022). The dilapidated texture of Tehran's District 15 suffers from an inappropriate social resilience due to the developmental conditions of the area. For this, it is critical to explain social resilience to better deal with the implications of critical incidents. This study had an applied goal and fell under descriptive-analytical research. The statistical population was composed of 385 households (using the Cochran formula) living in the dilapidated texture neighborhoods of the district. Statistical data were analyzed by factor analysis and PLS[1]-based structural equation modeling using One-sample t-test and SPSS and Smart PLS3 software. Finally, resilience maps were drawn and analyzed in the GIS environment. Results from testing study hypotheses using the PLS model, under the t-statistic coefficient of over 2.58, represented a significant relationship (at the confidence level of $P<0.01$) between the components influencing social resilience. Social capital, awareness and knowledge, social participation, skills and capacities, and the sense of place belonging held averages of 2.46, 3.39, 2.54, 3.17, 2.73, and 2.4, respectively, which were smaller than the criterion average of 3.67 ($P<0.05$). Findings showed that neighborhoods in District 15 of Tehran suffered from undesirable social resilience, with the Atabak and Minabi neighborhoods experiencing the worst conditions with respective averages of 2.57 and 2.69.

**Keywords**: resilience, dilapidated textures, social resilience, structural equation.

## Introduction

Social resilience refers to people's capacity to learn from experiences and their conscious participation in interacting with social and physical environments (Herreria et al., 2006:85). When a crisis occurs, the concept of social resilience takes different senses; it is, however, defined as the capacity to absorb, adapt, and transform, or as the ability of social institutions or social processes to predict, react, and confront natural disasters (Nicholas et al., 2016, 229). Social resilience has been a topic of interest for decades. In this connection, the International Union's Strategy for Disaster Risk Reduction set out a program called "Strengthening Nations' Resilience Against Disasters" within the Hyogo Plan Framework, which was outlined at the 2005 Global Hyogo Conference in Kobe of Japan on Crisis Reduction. This framework laid out plans for the upcoming years of 2005 to 2015. This program helps reduce the vulnerability of societies in the wake of crises and increases their resilience (Adini et al.,

[1] Partial Least Squares

2017:42). Hence, the concept of resilience appears to be evolving in all stages of crisis incident management, as well as in social bio-environmental areas (Jacinto et al., 2020:3). Extensive conceptual discussions in this connection have led to the development of some natural and social indicators; for this, it is crucial to conceptually understand social and natural factors relative to place and time (Béné et al., 2017:215). Natural disasters across the world (Mohammad Nia et al., 2024) threaten life on the earth and inflict irreparable damage to various dimensions of human life, including economic, housing, social, and environmental areas (Hanaei et al., 2023). This makes accurate predictions of environmental losses within the context of global changes more difficult (Yazdani, 2024).

Thus, concerning dilapidated textures-related problems with a multi-faceted nature, physical and social dysfunctions appear to be more severe and involve a higher number of disasters (Ansari et al., 2021). To this end, the concept of social resilience evolved in social and environmental settings to change approaches to reducing disaster-related risks (Ebadollah-Zade Malaki et al., 2022). Resilience serves as a novel and modern, albeit multifaceted and efficient perspective, which pays special attention to the social dimension, in addition to other dimensions (Estebsari et al., 2024). Due to their severity and short-term influence on human communities, natural hazards have become one of the main concerns of urban planners and practitioners, especially the professionals involved in dilapidated textures. For this, strengthening and supporting communities living in these areas would play a key role in reducing hazards and damages (Gentle et al., 2020:2). Hence, in conjunction with preparing the physical spaces of dilapidated textures to deal with these natural crises, it is required that communities living in neighborhoods be provided with relevant training and skills to cope with hazards and take necessary measures to eliminate them. This will certainly help them take the first step to protect their lives and those of their relatives, as well as the crisis-hit society.. This will also help reduce the large scope of dysfunctionality in the wake of crises (Baradaran Khanian et al., 2021). In sum, it is important to identify the social components influencing dilapidated textures. In this connection, Tehran's District 15 has 246 hectares of vulnerable and dilapidated textures exposed to seismic hazards, making it prone to geological hazards. Meanwhile, the non-observance of safety rules such as safe construction principles and failure to provide necessary operational capabilities to manage incidents have triggered social problems, including the migration of locals to other areas of the city, the influx of migrants with various social and economic backgrounds to these regions, poor social solidarity, a low sense of attachment to place, the lack of citizenship training in all areas, especially in dealing with natural incidents, etc. For this, the social features of Tehran City must be investigated in time of crisis. Therefore, this study aimed to explain the components and indicators of social resilience and determine the extent to which the indicators influence urban social resilience. The study also emphasized the significance of resilient crisis management policies in the selected region to answer the following hypotheses:

1. The social resilience of the dilapidated textures of neighborhoods in District 15 of Tehran appears to be inappropriate.
2. The social components and social resilience of the dilapidated textures of neighborhoods in District 15 of Tehran are significantly correlated.
3. Social components directly influence the social resilience of the dilapidated textures of neighbors in District 15 of Tehran.

No comprehensive study has ever sought to explain the social factors influencing urban social resilience. Research on resilience has tended to focus on physical, environmental, and economic factors, with fewer studies discussing social factors. Therefore, compared to the research on resilience, this study is seen as a novel study. Concerning social resilience, this study employed the PLS-based structural equation modeling to causally investigate the interrelationship of each of the components and to evaluate them individually. Later, the study used the coefficient of determination to investigate the significance path between the constructs under study and to specify the resilience of the neighborhoods while analyzing resilience-related implications. This study is a novel one and has practical implications.

## Theoretical Foundations of Study

### Concept of Resilience

The concept of resilience was originally developed to deal with disasters and hazards (Cutter et al., 2014:68). Holling and Gunderson (2002) defined resilience as the *capacity of a system to absorb changes and disturbances and maintain the same relationships between populations of stable variables.* Resilience represents a return to the past (Kelin et al., 2003:39). The term resilience was first applied by Holling (1973) in ecology, Adger (2007) in a social system, Carpenter (2010) in geography and the environment, and Bruneau in incident management (2003). This term resilience was then widely adopted following the recognition of the Hyogo Framework back in 2005, with numerous ecological, social, economic, sociological, and psychological definitions introduced ever since. Since the 1980s onwards, especially in the 1990s, the concept of resilience has been evolving in risk management and in disasters and social-environmental domains. This term has since then undergone changes at a global scale (Folke, 2006:253). Cutter (2014), for example, maintained that resilience refers to the capacity of a society system to account for and recover from crisis-related impacts. To him, resilience includes a category of internal conditions allowing the system to absorb and deal with incident impacts, defining it to be a post-incident adaptive process that facilitates the system's capacity to reorganize, change, and learn how to respond to a threat.

### Social Resilience

The term resilience was originally introduced by Adger (2000), who defined it to be the capacity of groups to cope with external stresses and disturbances when encountering social, political, and environmental changes. Adger was followed by Folke (2006) who defined resilience to be social system's capacity to absorb disturbances, reorganize, and maintain the same functioning, structure, identity, and previous feedback. For Bon et al., (2017), social resilience refers to people's capacity to learn from experiences and their conscious participation to learn how to interact with social and physical environments. The social resilience and flexibility of various groups within a community may differ from each other, suggesting their different reactions on critical occasions (Wickes et al., 2017:101).

### Dilapidated Textures

Dilapidated textures or urban decay represent some legal boundaries of a city that appear to be vulnerable due to physical decay and the lack of accessibility to urban installations, services, and infrastructure. These areas also suffer from low spatial, environmental, economic, and social values, failing to automatically renovate due to the poverty of their residents and land owners. On the other hand, investors have little or no motive to invest in these areas. The concept of dilapidated urban textures generally refers to degraded and worn-out social, economic, and physical conditions of the urban texture. Urban decay eliminates collective memory and degrades urban life (Habibi et al., 2007).

As given in Table 1, the conceptual approaches of resilience are divided into three categories: sustainable resilience, transformative residence, and recovery resilience.

**Table 1: Conceptual approaches of resilience**

| | |
|---|---|
| **Sustainability** | The sustainable resilience approach is derived from ecological studies. This approach defines resilience to be the capacity to return to the previous state, describing resilience to be the level of disturbance absorbed or tolerated by a system before it transfers to another state. |
| **Transformative** | Transformative resilience concerns social resilience and refers to society's capacity to react to adaptive transformation, suggesting a change toward the new state being more stable under the new environment, rather than simply returning to the previous state. This approach concerns the society's adaptability to incidents. In a new social system, this approach also creates opportunities to help experience new innovative work and sustainable development and is associated with such concepts as renovation, revival, and self-organization. |
| **Recovery** | The recovery approach indicates the society's capacity to return to the past, bouncing back from changes and stressors and returning to the initial state; it is a benchmark measured by the time spent on recovery. |

**Source: Etinay et al., 2018; Holling & Gunderson, 2002; Folke, 2006; Nicholas et al., 2016**

Much research has investigated the concept of resilience, including Mayunga (2007) who studied social resilience by measuring five economic, social, physical, human, and natural capitals, proposing resilience-related indicators for each capital.

In a study, Bon et al. (2017) investigated the adaptive and resilience capacity of people and societies, effective flexibility indicators, as well as welfare and shock/stress indicators.

Wickes et al. (2017) evaluated social indicators, analyzing the level of constancy, efficiency, and social capital along with training and learning in a neighborhood within two different periods, i.e., before and after a crisis.

Chuang et al. (2018) compared ecological and social resilience, concluding that applying ecological resilience to quantitatively evaluate society would serve as an appropriate way to manage incidents in human and natural dimensions.

Jacinto et al. (2020) investigated indicators to evaluate social resilience in societies affected by floods, explaining natural and social indicators and their impacts on communities living in neighborhoods.

**Dimensions of Resilience**

Resilience is a multi-faceted approach and involves various dimensions. This section concerns four social, economic, institutional, and physical dimensions as the dimensions of resilience.

**Table 2: Dimensions and indicators of resilience**

| Dimensions | Definition | Indicators |
|---|---|---|
| **Social** | The social dimension emphasizes societies' different social capacities to provide positive reactions, adapt to changes, maintain adaptive behaviors, and help recover following incidents. These capacities will improve upon promoting communications, risk awareness, readiness, and developing incident management plans, as well as ensuring for expediting the recovery process. | Awareness, knowledge, skills, attitudes, social capital, social network, society values, honest-oriented organizations, local perception of danger, counseling, health and welfare, quality of life, age, accessibility, language, special needs, place attachment, religion, social engagement, tendency to maintain cultural criteria, and post-incident processes |
| **Economic** | The economic dimension emphasizes people's and societies' reactions and adaptation to reduce potential damages caused by incidents, suggesting the societies' economic life capacity. | The capacity to compensate for financial losses, the ability to return to appropriate income and occupational conditions, and provide capital, access to financial services, savings, and household capital, insurance, the severity of amounts of damage |
| **Institutional** | Institutional dimension emphasizes reducing risks, planning, and learning from the experiences of previous incidents. Institutional resilience refers to the capacity of societies to reduce incident-related risks, employ local people to reduce risks, create organizational bonds, and improve and protect social systems within a society. | Infrastructure, institutional relations and functions, the physical features of institutions, such as local entities, accessibility to information, trained and voluntary forces, rules and regulations, the interactions between local institutions and |

| | | |
|---|---|---|
| | | people, satisfaction with institutional functions, responsibility-taking, decision-making centers, capacity, leadership, training, and experience |
| **Physical/environmental** | The physical dimension helps evaluate the society's reaction to and recovery from hazards, such as establishing shelters, residential units, and infrastructure, e.g., pipelines, streets, passageways, hospital facilities. | Number of main linking roads, pipelines, roads, vital infrastructure, the transportation network, land use, shelter capacity, type of housing, materials, premise strength, quality and age of premise, ownership, type of construction, building heights, local premise spaces |

**Source: Norris, 2008; Adger, 2000; Cutter et al., 2008; Maguire & Hagen, 2007; Rose, 2004; Mileti, 1999; Folke, 2006; Mayunga, 2007; Wickes, 2017; Saja et al., 2017**

**Area Under Study**

As one of Tehran's suburban areas, District 15 had once many gateways in the past, having served as entrances for travelers coming to Tehran. This city was characterized by the highest rates of [construction] expansion and population growth, especially during the years of the Islamic Revolution, with the growth rate of the area rapidly increasing in 1979 with the onset of the Islamic Revolution and the development of the 25-year master plan of Tehran City. Shortly after the development of the master plan, almost all of the vacant areas of the region were subjected to urban construction and turned into dense urban textures.

District 15 is bounded to the north by Ghasr-e-Firouzeh Barracks, 45-m Ahang, Khavaran St., eastern Shush, to the west by Fedaiyan-e-Eslam St., to the south by Dolat-Abad St., Mt. Bibi Shahrbanou, and Cement Factory, and to the east by eastern mountains, and the eastern limits of Afsariyeh territories. Part of the regional area lies within urban boundaries. This district involves 8 areas, six of which lie within the legal boundaries of the city spanning 8.27 $km^2$, and the remaining two are within the city exclusion of Tehran. The city exclusion, regulated by the district's municipality, covers an area of 176 $km^2$, comprising 14.6% of the total area of Tehran City exclusion. This area spans the boundaries of two cities of Tehran and Rey, as specified by national administrative division laws.

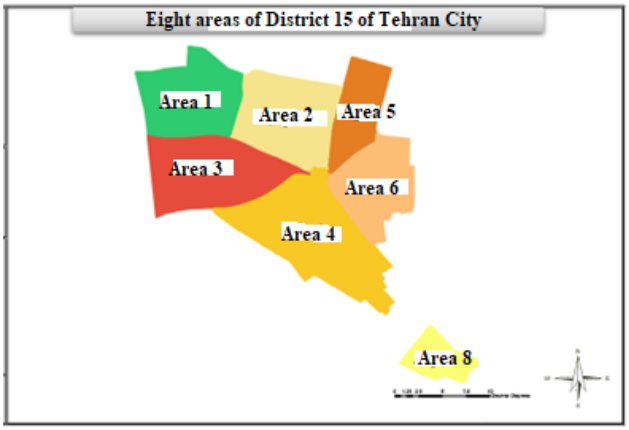


**Figure 1: Eight areas of District 15 of Tehran City (Source: Author, 2024)**

**Methodology**

This study fell under descriptive-analytical research. For the theoretical foundations section, the study used the library method, and for the collection of data, it used the field survey of households living in eight neighborhoods (out of 20 neighborhoods), which suffered from the highest rates of dilapidated textures in District 15. The neighborhoods were: Eslamabad, Moshiriyeh, Atabak, Karvan, Minabi, Afsariyeh, northern Masoudiyeh, and southern Masoudiyeh. The total population of the statistical population amounted to 659468 people, as 400 questionnaires were distributed and completed among subjects for greater accuracy and confidence. Out of this number, 358 questionnaires were obtained as samples based on the Cochran formula. Also, SPSS and SMART PLS software were used to measure the resilience of social factors in the dilapidated urban textures. To measure the validity of the questionnaires across the city of Tehran, 30 experts and professors, as well as urban administrators were interviewed, which led to the confirmation of the questionnaires. Meanwhile, content and convergent validity were used to verify the measurement of the validity. Content validity was established by ensuring that indicators of measurement were consistent with those of the literature, and this validity was obtained by surveying experts. Convergent validity states that indicators of each construct are intermediately correlated. According to Fornell and Larcker (1981), the measure of convergent validity states that the average output variances are greater than 0.5 (Choua & Chen, 2009: 489). This study used two measures (Cronbach's alpha coefficient and composite reliability coefficient) based on Fornell and Larcker's views (1981). Cronbach's alpha coefficients of all variables were greater than the minimum rate of 0.6. Unlike Cronbach's alpha coefficient, composite reliability implicitly assumes that each indicator has a similar weight and is based on the true factor loadings of each construct, thereby presenting a better reliability measure. A composite reliability value of over 0.7 indicates an acceptable internal consistency, while a value of less than 0.6 indicates a lack of reliability (Arab-Halvaei et al. 2023). Table 3 below gives the validity and reliability results of the measurement instrument.

**Table 3: Validity and reliability coefficients of the constructs' measurement instrument**

| Thid-order variables | Second-order variables | First-order variables | Cronbach's alpha reliability | Composite reliability | Spearman reliability | Convergent validity |
|---|---|---|---|---|---|---|
| **Dilapidated texture resilience** | **Social dimension** | **Social capital** | 0.606 | 0.784 | 0.746 | 0.544 |
| | | **Awareness and knowledge** | 0.863 | 0.898 | 0.881 | 0.598 |
| | | **Participation and cooperation** | 0.651 | 0.784 | 0.74 | 0.584 |
| | | **People skills during crises** | 0.652 | 0.765 | 0.722 | 0.411 |
| | | **Sense of belonging** | 0.704 | 0.827 | 0.852 | 0.618 |
| | | **Social security** | 0.621 | 0.769 | 0.716 | 0.534 |
| | | **Total** | 0.75 | 0.798 | 0.931 | 0.48 |

As shown in Table 3, Cronbach's alpha was calculated to evaluate the internal consistency of the measurement instrument. Cronbach's alpha of over 0.7 indicates acceptable reliability. However, Moss et al. (1998) demonstrated that a value of 0.6 indicated a coefficient threshold for variables with fewer questions. Composite reliability measures the adequacy of items of a latent factor, while a composite reliability value of over 0.7 indicates adequate internal consistency (Nunnally & Bernstein, 1994). It is worth noting that composite reliability is a better measure than alpha (Vinzi et al., 2010:78). As a result, Cronbach's alpha and composite reliability of all latent variables were assigned acceptable coefficients. Convergent validity is the average variance shared between each construct with its indicators. Fornell and Larcker (1981) considered the convergent validity value of over 0.5 acceptable (Arab Halvaei et al. 2023). Convergent validity of all study variables held good coefficients; therefore, the indicators of this study had acceptable reliability, underscoring the model was confirmed with acceptable validity.

**Convergent Validity of Constructs' Factor Loadings**

Convergent validity compares the correlation of indicators of a construct and the correlation of indicators of other constructs.

**Table 4: Convergent validity of constructs' factor loadings**

| Items | Social | Awareness and knowledge | Participation and cooperation | People's skills during a crisis | Sense of attachment | Social security |
|---|---|---|---|---|---|---|
| **1e** | 0.67 | 0.2 | 0.1 | -0.21 | 0.08 | 0.12 |
| **2e** | 0.7 | 0.02 | 0.12 | -0.1 | 0.14 | 0.16 |
| **3e** | 0.83 | 0.21 | -0.05 | 0.1 | 0.07 | 0.22 |
| **4d** | 0.13 | 0.71 | 0.05 | 0.19 | 0.07 | 0.21 |
| **5d** | 0.13 | 0.65 | -0.01 | 0.13 | 0.02 | 0.07 |
| **6d** | 0.22 | 0.74 | 0.09 | 0.02 | 0.12 | 0.15 |
| **7d** | 0.17 | 0.82 | 0.17 | 0.24 | 0.12 | 0.33 |
| **8d** | 0.08 | 0.82 | 0.1 | 0.26 | 0.02 | 0.32 |
| **9d** | 0.28 | 0.88 | 0.07 | 0.27 | 0.08 | 0.36 |
| **10m** | -0.09 | 0.05 | 0.73 | -0.04 | 0.2 | -0.01 |
| **11m** | 0.09 | 0.02 | 0.64 | 0.06 | 0.23 | 0.04 |
| **12m** | 0.1 | 0.14 | 0.85 | -0.11 | 0.37 | 0.06 |
| **13m** | -0.06 | 0.06 | 0.52 | 0.01 | -0.02 | 0.03 |
| **14t** | 0.07 | 0.23 | -0.03 | 0.81 | 0.05 | 0.34 |
| **15t** | -0.11 | 0.1 | -0.13 | 0.72 | -0.01 | 0.19 |
| **16t** | -0.13 | 0.12 | -0.06 | 0.49 | -0.03 | 0 |
| **17t** | -0.09 | 0.2 | 0 | 0.64 | 0.04 | 0.07 |
| **18t** | 0 | 0.09 | 0.05 | 0.47 | -0.06 | 0.07 |
| **19h** | 0.11 | 0.01 | 0.17 | -0.07 | 0.68 | 0.1 |
| **20h** | 0.15 | 0.12 | 0.36 | 0.06 | 0.91 | 0.23 |
| **21h** | 0 | 0.04 | 0.2 | 0.01 | 0.75 | 0.15 |
| **22am** | 0.01 | 0.11 | -0.02 | 0.78 | 0.23 | 0.53 |
| **23am** | 0.21 | 0.27 | -0.01 | 0.21 | 0.1 | 0.81 |
| **24am** | 0.23 | 0.31 | 0.11 | 0.19 | 0.19 | 0.81 |
| **25n** | 0.07 | 0.24 | -0.07 | 0.29 | -0.11 | 0.22 |

As shown in Table 4, factor loadings show significantly acceptable coefficients, suggesting that the items under study are well-measured. It is thus concluded that the extent to which social components are correlated with the social resilience of the dilapidated-textured neighborhoods of Tehran's District 15 is highly significant. On the other hand, the hypothesis stating the correlation between social components and the social resilience of the dilapidated textures of neighbors in Tehran's District 15 is supported.

**Findings**

**Relationships between Components of Social Resilience**

District 15 of Tehran is a historical area of this city; many residents of this city have moved from this area due to dilapidated textures and urban decay, as well as the influx of migrants. Currently, migrants and older residents comprise the population of the area. This area was selected for the study due to its social, cultural, historical, and physical features. The social dimension consisted of six indicators of social capital, awareness and knowledge, participation and cooperation, people's skills during a crisis, the sense of belonging, and social security, which are presented in the factor structure of the model in detail.

**Factor Structure of the Model**

Figure 2 below illustrates the hierarchical structure of the social resilience model of dilapidated textures.

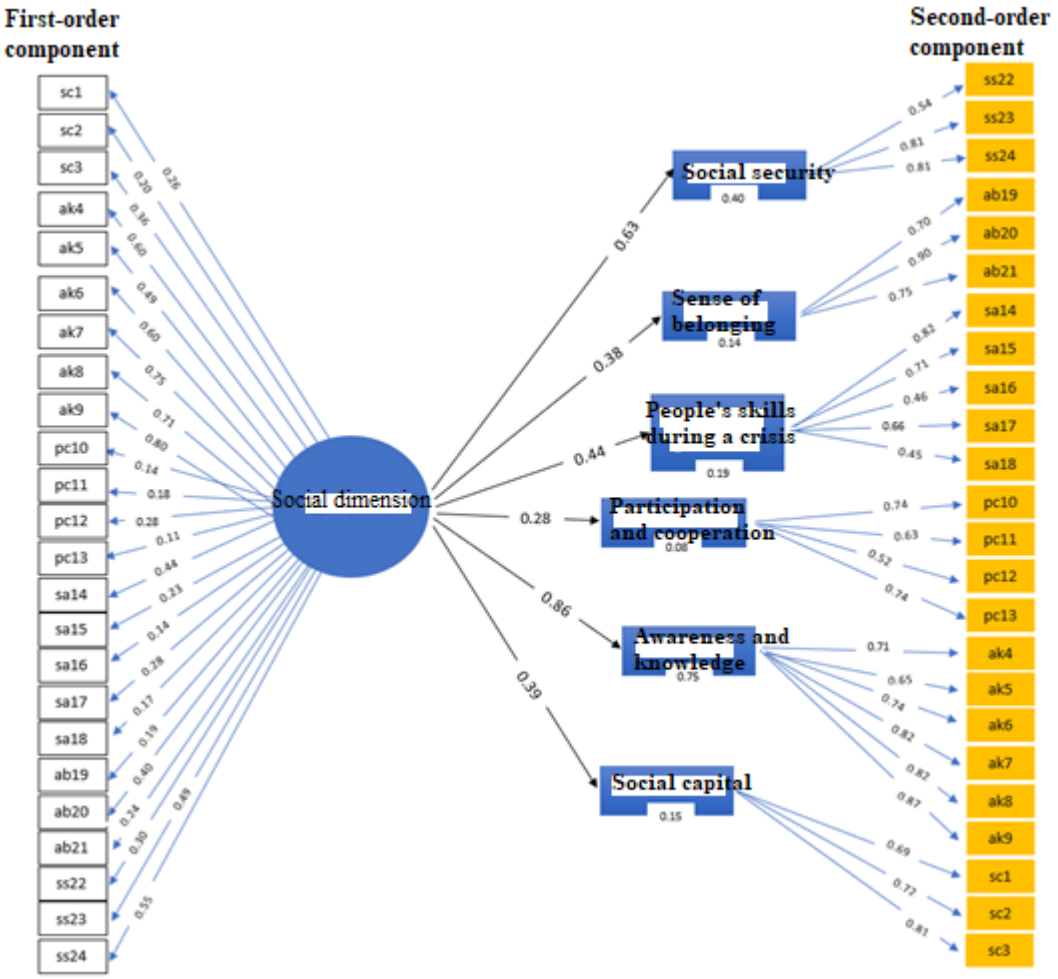


**Figure 2: Structural model of standard coefficient**

The PLS path analysis uses manifest variables of loadings to conceptualize the model of hierarchy (Guinot et al. 2005; Tenenhaus et al., 2001). Hence, a lower-order latent variable is developed from all higher-order manifest variables (questions); for example, as shown in Figure 2, each of the first-order latent variables (i.e., the variable of social resilience dimension) consists of five second-order latent variables, with each of the second-order latent variables consisting of a number of manifest variables (items). According to this hierarchical model, each first-order latent variable is specified using all manifest variables of second-order latent variables; therefore, manifest variables are used twice; once for the second-order latent variable (initial loadings), and once for the first-order latent variable (secondary loadings). This approach develops into a higher-order hierarchical model, with the latent variable scores calculated from lower-order latent variables. One of the advantages of PLS is to evaluate the hierarchical model. This approach was used by this study to structure the higher-order latent variable (Karimi et al., 2022). At this stage, the structural model was used to causally investigate the interrelationships between the indicators. On the other hand, the effects of the study indicators can be examined by investigating the relationships between the indicators of each variable using the relevant coefficient. To examine the significance of the path coefficients, the open sampling method with 5000 samples proposed in the PLS method was used (Jahani et al., 2024). Table 5 results show that the model has good validity.

**Table 5: Structural model of the first- and second-order path**

| First-order to second-order path | | Path coefficient | Sig. coefficient | Coefficient of determination | Sig. level | Intervals of confidence Bot Strap | |
|---|---|---|---|---|---|---|---|
| **First-order variables** | **Second-order variables** | | | | | 2.5% | 97.5% |
| **Social dimension** | **Social capital** | 0.365 | 4.967 | 0.153 | 0.000 | 0.23 | 0.498 |
| | **Awareness and knowledge** | 0.862 | 52.257 | 0.761 | 0.000 | 0.832 | 0.895 |
| | **Participation and cooperation** | 0.28 | 3.034 | 0.062 | 0.003 | 0.133 | 0.432 |
| | **People's skills during a crisis** | 0.445 | 6.03 | 0.190 | 0.000 | 0.329 | 0.601 |
| | **Sense of belonging** | 0.336 | 4.167 | 0.140 | 0.000 | 0.127 | 0.452 |
| | **Social security** | 0.636 | 2.067 | 0.404 | 0.000 | 0.574 | 0.698 |

T significance coefficient of over 1.96 indicates a significant relationship at the confidence level of P<0.005

T coefficient of over 2.58 indicates the significant relationship at the confidence level of P<0.01

T coefficient of over 3.23 indicates he significant relationship at the confidence level of P<0.001

**Table 6: Structural model of third-order to second-order path**

| Third-order to second-order path | | Path coefficient | Sig. coefficient | Coefficient of determination | Sig. level | Intervals of confidence Bot Strap | |
|---|---|---|---|---|---|---|---|
| **Third-order variables** | **Second-order variables** | | | | | 2.5% | 97.5% |
| **Resilience of dilapidated textures** | **Social dimension** | 0.738 | 28.979 | 0.544 | 0.000 | 0.682 | 0.779 |

The significance of path coefficients only shows the validity of the relationships; thus, the path coefficients given in Table 6 are greater than 2.58, showing the validity of the relationships at the confidence level of 0.99. The coefficient of determination suggests the effects of the exogenous variable on the endogenous variable.

This measure helps reduce errors in the measurement model and increases the variance between constructs and indicators, which is simply controlled for in the PLS.

Chain (1998) provided three values of 0.19, 0.33, and 0.67 as weak, medium, and strong values to discuss the intensity of relationships, with the coefficient of determination of the endogenous variables being at an acceptable level. A standard factor loading is specified for all items of each factor in Table 7. The indicator used to evaluate the relationship between each question and its underlying factors and other questions showed a value of over 0.44. This factor loading indicates the significance of the questions; therefore, all items were found to be significantly related to their underlying factors.

**Table 7: Measurement model and indicators for evaluating item reliability**

| Dimensions | Component | Indicators | Item No. | Factor loadings | Sig. | Level of sig. |
|---|---|---|---|---|---|---|
| | | **Social capital** | 1e | 0.69 | 8.585 | 0.000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Dilapidated texture resilience** | **Social dimension** | | 2e | 0.72 | 7.961 | 0.000 |
| | | | 3e | 0.81 | 15.483 | 0.000 |
| | | **Awareness and knowledge** | 4d | 0.71 | 28.846 | 0.000 |
| | | | 5d | 0.65 | 21.16 | 0.000 |
| | | | 6d | 0.74 | 27.45 | 0.000 |
| | | | 7d | 0.82 | 43.298 | 0.000 |
| | | | 8d | 0.82 | 41.087 | 0.000 |
| | | | 9d | 0.88 | 68.133 | 0.000 |
| | | **Participation and cooperation** | 10m | 0.73 | 2.138 | 0.035 |
| | | | 11m | 0.63 | 2.898 | 0.005 |
| | | | 12m | 0.85 | 2.999 | 0.003 |
| | | | 13m | 0.52 | 1.832 | 0.07 |
| | | **People's skills during a crisis** | 14t | 0.82 | 20.855 | 0.000 |
| | | | 15t | 0.71 | 11.426 | 0.000 |
| | | | 16t | 0.46 | 4.675 | 0.000 |
| | | | 17t | 0.66 | 11.96 | 0.000 |
| | | | 18t | 0.47 | 5.42 | 0.000 |
| | | **Sense of belonging** | 19h | 0.68 | 6.244 | 0.000 |
| | | | 20h | 0.91 | 18.681 | 0.000 |
| | | | 21h | 0.75 | 13.903 | 0.000 |
| | | **Social security** | 22am | 0.53 | 6.074 | 0.000 |
| | | | 23am | 0.81 | 30.124 | 0.000 |
| | | | 24am | 0.81 | 34.729 | 0.000 |

**Social Resilience of Dilapidated Texture**

One-sample t-test was used to analyze the components. Table 8 gives the results of this test. To assign scores, the total average scores of questions in each component were specified as the basis. On the Likert 5-point scale, the cut-off point of the middle spectrum of the questionnaire was 2. The average comparisons measure in this study revealed that an experimental average of 1-1.99, 1.99-2.99, 2.99-3.99, 4, and 5, were highly unfavorable, unfavorable, relatively favorable, favorable, and highly favorable, respectively. Thus, a value average of 3.67 exhibits a relatively favorable value.

**Table 8: T test of social dimension items**

| **Dimensions** | **Items** | **Descriptive statistics** | | **df=384 Value average=3.67** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **Average** | **SD** | **Diff. average** | **T** | **Sig.** | **Interval values at 95%** | |
| | | | | | | | **Lower bound** | **Upper bound** |
| **Social capital** | 1e | 2.24 | 0.56 | -1.43 | -50.03 | 0.000 | -1.48 | -1.37 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2e | 2.36 | 0.56 | -1.31 | -46.03 | 0.000 | -1.36 | -1.25 |
| | 3e | 2.77 | 0.6 | -0.9 | -29.48 | 0.000 | -0.96 | -0.84 |
| | Total e | 2.46 | 0.37 | -1.21 | -63.6 | 0.000 | -1.25 | -1.18 |
| **Awareness and knowledge** | 4d | 2.98 | 0.62 | -0.69 | -22.01 | 0.000 | -0.76 | -0.63 |
| | 5d | 2.98 | 0.67 | -0.69 | -20.24 | 0.000 | -0.76 | -0.62 |
| | 6d | 3.68 | 0.63 | 0.01 | 0.33 | 0.74 | -0.05 | 0.07 |
| | 7d | 3.62 | 0.65 | -0.05 | -1.68 | 0.1 | -0.12 | 0.01 |
| | 8d | 3.73 | 0.59 | 0.06 | 1.98 | 0.05 | 0 | 0.12 |
| | 9d | 3.34 | 0.83 | -0.33 | -7.83 | 0.000 | -0.41 | -0.25 |
| | Total d | 3.39 | 0.3 | -0.28 | -18.72 | 0.000 | -0.31 | -0.25 |
| **Participation and cooperation** | 10m | 3.62 | 0.86 | -0.05 | -1.19 | 0.24 | -1.14 | 0.03 |
| | 11m | 2.27 | 0.77 | -1.4 | -35.4 | 0.000 | -1.47 | -1.32 |
| | 12m | 2.28 | 0.6 | -1.39 | -45.7 | 0.000 | -1.45 | -1.33 |
| | 13m | 1.97 | 0.32 | -1.7 | -103.04 | 0.000 | -1.73 | -1.66 |
| | Total m | 2.54 | 0.33 | -1.13 | -66.6 | 0.000 | -1.17 | -1.1 |
| **People's skills during a crisis** | 14t | 3.91 | 0.82 | 0.24 | 5.85 | 0.000 | 0.16 | 0.33 |
| | 15t | 2.5 | 0.73 | -1.16 | -31.25 | 0.000 | -1.23 | -1.08 |
| | 16t | 2.87 | 0.81 | -0.8 | -19.43 | 0.000 | -0.88 | -0.72 |
| | 17t | 2.83 | 0.56 | -0.84 | -29.44 | 0.000 | -0.89 | -0.78 |
| | 18t | 3.73 | 0.52 | 0.06 | 2.28 | 0.02 | 0.01 | 0.11 |
| | Total t | 3.17 | 0.32 | -0.5 | -30.54 | 0.000 | -0.53 | -0.47 |
| **Sense of belonging to place** | 19h | 2.33 | 0.61 | -1.34 | -43.21 | 0.000 | -1.4 | -1.28 |
| | 20h | 2.82 | 0.52 | -0.85 | -32.23 | 0.000 | 0.91 | -0.8 |
| | 21h | 3.05 | 0.71 | -0.62 | -17.13 | 0.000 | -0.69 | -0.55 |
| | Total h | 2.73 | 0.43 | -0.94 | -42.77 | 0.000 | -0.98 | -0.9 |
| **Social security** | 22am | 3.98 | 0.52 | 0.31 | 11.52 | 0.000 | 0.25 | 0.36 |
| | 23am | 2.76 | 0.66 | -0.91 | -27.2 | 0.000 | -0.98 | -0.85 |
| | 24am | 2.4 | 0.52 | -1.27 | -48.26 | 0.000 | -1.32 | -1.22 |
| | Total am | 3.04 | 0.3 | -0.63 | -41.53 | 0.000 | -0.66 | -0.6 |
| | Total | 2.89 | 0.17 | 007 | 7.75 | 0.000 | 0.05 | 0.09 |

T-test results in Table 8 show that social factors with an average of 2.89 ($P<0.05$ and a value average of less than 3.67) in District 15 of Tehran did not have an appropriate condition; also, components of the dimension of participation and cooperation with averages of 1.97 and 2.54, respectively ($P<0.05$ and a value average of less than 3.67) experienced the worst conditions, as they were lower than the medium range. This indicates that people were less engaged in urban planning. Also, there was weak cooperation between urban entities. Components of social capital with an average of 2.46, the sense of belonging to place with an average of 2.73, and social security with an average of 3.04 ($P<0.05$ and a value average of equal to 3.67) were respectively under the worst conditions and unfavorable levels. As shown in Table 8, a T coefficient of over 2.58 indicates a significant relationship at the confidence level of $P<0.01$. The study hypotheses were supported at the level of 99%. This suggests that there is a positively significant relationship between social components and the social resilience of dilapidated textures. The more social dimensions (e.g., social capital, the sense of belonging to place, social participation public awareness and knowledge, trust and cooperation between people and entities, adherence to values, identity, and security) are greater among people, the higher the social resilience. This indicated that the second hypothesis was also supported.

**How Would Social Resilience of Neighborhoods in the Dilapidated Texture of District 15 of Tehran Look Like?**

According to the value average of 3.67, the selected neighborhoods in District 15 of Tehran enjoy a lower social resilience during a crisis, as given in Table 9. In terms of total social dimensions, the neighborhoods of Atabak, Minabi, southern Masoudiyeh, Moshiriyeh, and northern Masoudiyeh held the lowest and highest average scores, respectively at 2.57, 2.69, 2.78, 2.84, and 2.97. This indicates that District 15 of Tehran was not in an appropriate condition in terms of social resilience, i.e., showing lower social resilience during a crisis and being more vulnerable. Only were the neighborhoods of Karvan and Afsariyeh under relatively favorable conditions with averages of 3.5 and 2.99. Also, the average responses to all components of the social dimension were smaller than their value averages, with only the components of awareness and knowledge and people's skills during a crisis being favorable at 3.2. This suggested the significance and effect of this component on social resilience, as all social components were shown to be under unfavorable conditions.

**Table 9: average and percentage of response to components of social resilience dimension**

| Neighborhoods | Statistic | Social capital | Awareness and Knowledge | Participation and cooperation | People's skills during a crisis | Senses of belonging | Social security | Social dimension |
|---|---|---|---|---|---|---|---|---|
| **Eslamabad** | **Average** | 51.52 | 71.52 | 56.36 | 60.73 | 54.55 | 60 | 59.11 |
| | **Percentage** | 2.58 | 3.58 | 2.82 | 3.04 | 2.73 | 3 | 2.96 |
| **Moshiriyeh** | **Average** | 48.67 | 66.33 | 51.5 | 57.2 | 56.67 | 60.67 | 56.84 |
| | **Percentage** | 2.43 | 3.32 | 2.58 | 2.86 | 2.83 | 3.03 | 2.84 |
| **Atabak** | **Average** | 46.67 | 61.67 | 46.5 | 62.8 | 54.67 | 57.33 | 54.94 |
| | **Percentage** | 2.33 | 3.08 | 2.33 | 3.14 | 2.73 | 2.87 | 2.57 |
| **Minabi** | **Average** | 44 | 64.67 | 43.5 | 65.2 | 48.67 | 57.33 | 53.89 |
| | **Percentage** | 2.2 | 3.23 | 2.18 | 3.26 | 2.43 | 2.87 | 2.69 |
| **Karvan** | **Average** | 54.07 | 68.89 | 55.56 | 65.33 | 60 | 62.22 | 61.01 |
| | **Percentage** | 2.7 | 3.44 | 2.78 | 3.27 | 3 | 3.11 | 3.05 |
| **Afsariyeh** | **Average** | 51.33 | 70.33 | 53 | 65.6 | 53.33 | 65.33 | 59.82 |
| | **Percentage** | 2.57 | 3.52 | 2.65 | 3.28 | 2.67 | 3.27 | 2.99 |
| **Northern Masoudiyeh** | **Average** | 54.81 | 68.59 | 50.44 | 65.78 | 54.37 | 62.22 | 59.37 |
| | **Percentage** | 2.74 | 3.43 | 2.52 | 3.29 | 2.79 | 3.11 | 2.97 |
| **Southern Masoudiyeh** | **Average** | 41.33 | 70.33 | 48.5 | 66 | 55.33 | 62.67 | 57.36 |
| | **Percentage** | 2.07 | 3.52 | 2.43 | 3.3 | 2.77 | 3.13 | 2.87 |

As shown in the table above, Karvan and Afsariyeh neighborhoods are in a better and more appropriate position than other neighborhoods and show more resilience, while Atabak and Minabi neighborhoods are at a very inappropriate level, especially in terms of spatial belonging and the lack of participation and cooperation, making them less socially resilient during a crisis. This concludes that the first hypothesis is also supported.

**Suggestions and Conclusion**

This study explained the social resilience of the dilapidated texture of Tehran's District 15 using the six indicators of social capital, awareness and knowledge, social participation, skills and capacity, the sense of belonging to place, and security. Findings showed that the average social dimensions totaled 2.89, which was less than the medium range of 3.67, thereby showing an unfavorable condition. None of the components of social resilience experienced a similar position, with the Atabak, Minabi, southern Masoudiyeh, Moshiriyeh, and northern Masoudiyeh assigned the lowest and the highest averages, respectively, at 2.57, 2.69, 2.78, 2.84, and 2.97. This is indicative of the fact that the eight neighborhoods of the district do not enjoy an appropriate position, thereby being less socially resilient and more vulnerable when a crisis occurs. Findings also stressed the need for providing training and engaging citizens, as well as increasing the sense of belonging to the place. Citizens can be encouraged to engage more in public affairs if they are provided with training courses and given relevant responsibilities, which will finally help them participate in neighborhood affairs. This also requires government entities and urban administrators to take part and take respective measures. Increasing trust among residents and creating a spirit of cooperation among them will help create social security in neighborhoods. To increase the social resilience of the neighborhoods under study, urban authorities, and administrators are recommended to help increase resilience and reduce dilapidated texture vulnerability.

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