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CASE STUDY

Dimensions of social resilience in urban areas

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ABSTRACT

BACKGROUND AND OBJECTIVES: Social resilience is one of the ways to reduce social problems and is a factor for the success of social welfare programs, increasing trust and social capital; therefore, in recent years, more attention has been paid to the issue of social resilience. The present study deals with theoretical and experimental analysis of social resilience.

METHODS: The aim of this study was to investigate the level of social resilience in region one of Karaj city by descriptive-analytical method. The statistical population consisted of residents of District one of Karaj city, 384 of whom were randomly selected. The researcher-made questionnaire was confirmed by face validity and Cronbach's alpha of 0.85.

FINDINGS: Data analysis was performed using descriptive and inferential statistics in SPSS software. The results showed that the confidence component was 2.53, 1.73, 2.52, 4.14, 4.01 and 8.86 that all coefficients were higher than 2.59 at the significance level of 0.01. For the social capital component was 1.65, 6.14, 07.03,-1.01, and-0.35, which showed that all coefficients were higher than 2.59 (14, 15) at the significance level of 0.01. For the component of commonalities between residents component was 7.87, 11.74, 7.21, 0.85-1.17, 2.93, showing that all coefficients were higher than 2.59 at the significance level of 0.01. Also, the structural model of social cohesion, the criteria of goodness of fit index and the adjusted fit index were equal to 0.79, which indicates that the model has a moderate fit.

CONCLUSION: The purpose of this study was to investigate and measure the criteria of social resilience among the four dimensions of resilience in the settlement. As one of the most important ideas in urban planning is to create resilient cities that are resilient to social crises, therefore, paying attention to the dimensions of social cohesion, including: trust, social capital and commonalities between residents can ensure that a high level of social resilience is created and effectively operates in accordance with sustainability in society.

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INTRODUCTION

Cities are complex and interdependent systems and are very vulnerable to natural, man-made and terrorist threats (Salehi *et al*., 2011). Accidents have always threatened the life of human societies for many centuries (Dadashpour and Adeli, 2015). Resilience includes the conditions under which individuals and social groups adapt to environmental changes and in fact expresses the ability of society to respond to crises (Partovi *et al*., 2016). Resilience has different dimensions such as social, economic, political, physical and cultural resilience. The purpose of this study is to investigate and measure the criteria of social resilience among the four dimensions of resilience in the settlement. The concept of social resilience is introduced as the ability of communities to adapt to tensions and disturbances, to perform recovery activities to reduce social disruption (Rafieian *et al*., 2013). Considering that countries around the world are increasingly becoming urbanized, and given that by 2050 it is likely that more than 80% of the world's population will live in cities; Thus, cities represent dense and complex systems of interconnected services, which will become the main location of many potential disasters. Among the factors that increase the risk of disasters in urban areas can be: Unplanned cities, poverty, population growth, population overflow, and apartment living (Kavian and Salmani Moghadam, 2014). Overcrowding in cities, infrastructure and services have made people very vulnerable in cities. One of the most important ideas in urban planning is to create resilient cities that are resilient to social crises. Tolerance is a feature that varies from person to person and can grow over time. Or be reduced and formed on the basis of human intellectual and practical self-correction in the process of life trial and error. Resilience and its search is one of the most important human motivations. But resilience is not an issue that can be achieved only by formal and governmental organizations, but it is an issue that all members of society can provide the ground for it (Dalake *et al*., 2017). Citizens can contribute to its provision through social support, social solidarity, trust, social relations, etc., which is referred to as social capital. The significant role of social dimensions of resilience and how it is present in the lives of social actors is considered as a solution to social problems (Keck and Sakdapolrak, 2013). Social dimensions can affect other economic, cultural and political dimensions, etc.; in this way, it forms networks of neighbors, friends and colleagues and achieves mutual understanding about the methods of social trust and agreement, and also improves the situation of the community for solidarity, cooperation, collaboration and social participation of people in the community. This creates private and public interests (Graham *et al*., 2016). The rapid growth of urban population and the increasing expansion of large cities, especially the city of Karaj, is due to the intense rural-urban and urban-urban migration, which has led to the formation of an unbridled and unplanned atmosphere in the city of Karaj. Social problems in the District 1 of Karaj, such as social delinquency, unemployment, incoherence of citizens and ethnic diversity have reduced the degree of social resilience in the region; therefore, in this study, District 1 of Karaj city has been selected as a case study. Social problems in the under study district, such as social delinquency, unemployment, incoherence of citizens and ethnic diversity have reduced the degree of social resilience in the region. Therefore, in the current study, District 1 of Karaj city has been selected as a case study. The reason for addressing this issue in the study area and the need for knowledge and understanding of social resilience factors and creating a context for resilience of these factors in the study area has been strongly needed; In addition, this district has a multi-ethnic composition and has caused heterogeneity of the social context, and as a result, these factors have caused vulnerability and, consequently, posed threats to the social security of the region. Identifying social vulnerability factors in this area can be a step towards increasing the resilience of the district. Given what has been mentioned, it is necessary to examine the issue of resilience in the study area with its biodiversity, culture, ethnicity, its various challenges, from different perspectives. Considering that the study area has a multi-ethnic composition and has caused heterogeneity of social context, in the present study, by identifying the factors of social resilience, the step to increase the resilience of the study area can be taken. In this regard, questions are raised as follows:

What is the relationship between social capital and social resilience in the District 1 of Karaj?

What is the relationship between the dimensions of social capital and social resilience in the District 1 of Karaj city?

In line with the above questions, the following hypotheses are raised:

There seems to be a significant relationship between social capital and social resilience in the District 1 of Karaj city.

It seems that the existing social capacity in the study area to meet resilience does not fully meet the needs of residents in this area.

Research purposes

Identifying the most effective indicators of social resilience in Diustrict one of Karaj city;

Investigating the relationship between social cohesion and resilience in region one.

Theoretical foundations and background of research

The word (Resilience) in the dictionary has various synonyms. Ability to recover or recover quickly, change; Buoyancy and elasticity, as well as spring and elasticity can be good equivalent, but of course these words do not have the necessary reach and eloquence to convey the meaning of this word. For this reason, the word self-resilience, which means continuity in sustainability, can be considered the best synonym (Rezai, 2010). The root of the word resilience in Latin resilio means "going back to the past" (oxford, 2005). Striving for social resilience can improve living standards by increasing income, education, prenatal care, health, housing, employment, legal rights, crime safety, ethics in the local community, favorable population density, and Increase building resistance to hazards and accidents and diseases, quality of life or the ability to live in local communities. Preservation of values, cultural-local heritage, urban identity, collective memory of the city and education are other components of quality of life that lead to maintaining a sense of belonging to the place and restoring the spirit of life (Lak, 2013). Colburn and Seara (2011), consider social resilience to be related to the changeable part of social systems such as adaptability and variability, and has identified two characteristics for it: social capital and adaptive capacity . Social capital is concerned with the quality of relationships between members of society. The benefits of social capital appear when faced with adversity, war, and other changes. In another definition, social capital is related to the share that trust, norms and social network can have in solving common problems of society (Piran *et al*., 2017). Social resilience has different stages and significantly increases the durability and strength of society. The level of flexibility of different groups in a community varies, and their reactions vary in critical situations. The existence of social groups with different social and economic conditions and the degree of vulnerability in a society means that the resilience of different groups in a society is different from an accident. Social conditions cause some members of society to be less affected by the disasters and some more (Partovi *et al*., 2016). This approach is useful for understanding how society responds positively to change. Therefore, since change is inevitable in any society, it considers it what society needs to reach its original state. In other words, in their own society, individuals are able to shape the trajectory of change (transition) and play a central role in the amount of effect created by change (Zaker Haghighi and Akbarian, 2015). In summarizing the concepts of social resilience, social resilience can be known and seen in a national perspective. Social resilience represents a paradigm shift in people's minds about their own problems, the perception of others, and as a result, the need for a new perspective in determining interventions against problems and has different levels of individual and family (Ebadollahzadeh *et al*., 2017).

The concept of social resilience

Individuals and their interactions with the city as groups and categories are influenced by patterns arising from the social order of society. Social order has three main pillars for social functioning: individual identity (including age or gender), norms (behavioral rules), and social hierarchy (e.g. wealth and power). The relationship between social order, the functioning of social systems, and the power of social capital. Indicates social dynamism and resilience. For example, communities with dense social networks seem to have a greater capacity to respond to and adapt to environmental change. In recent years, social commentators have warned of declining employment and mutual trust in urban areas (Sapirstein, 2006). The experience of crises such as the 1995 Kobe earthquake and the 2011 earthquake, tsunami and nuclear attack in Japan shows that informal relations, especially with neighbors, are the first support and help in times of crisis (Lucini, 2013). Giddens (2009b) considers the strengthening of social networks as a way to promote the resilience

Table 1: Characteristics of resilient societies from the perspective of researchers (Dadashpour and Adeli, 2015)

Characteristics of resilient communities	Authors
Frequency, diversity, efficiency, internal independence, strength, correlation, adaptability and cooperation	Godschalk (2003)
Strength, redundancy, resourcefulness and speed	Bruneau *et al*., (2003)
Resistance, recovery, creativity	Kimhi shamai (2004)
Reaction, self-organization, learning	Sapirstein (2006)
Coordination and readiness of organizational capacities, rapid alert systems for possible reactions and reconstruction	Twigg (2007)

of communities. Because of the complex division of labor, all members are dependent on each other and face excellent solidarity, which is the result of this social progress and development (Durkim, 2002). Networks and social capital provide access to various types of assistance, including information, assistance, financial resources, child care through emotional and physical support, etc., when necessary, and it can be concluded that social aspects in societies are just as important if not more important than improving the physical infrastructure in crisis management (Lucini, 2013). Hence, the concept of ecological resilience can continue in social systems (Adger, 2000). Of course, it should be noted that there is a significant difference in behavior and structure between social and environmental systems in resilience (Mayunga, 2007). Table 1 illustrate characteristics of resilient societies from the perspective of researchers

Turner *et al*., (2003) equate community resilience with vulnerability and see it as the system's ability to respond to risks, and this response can be spontaneous or designed, public or private, individual or institutional, be predicted or reactive. Glavovic *et al*., (2003) defined social resilience as the capacity of societies to absorb change and the ability to cope with surprise and adapt to disorder. In the next stage, the definitions of social resilience became broader and the combination of the two words learning and adaptation in the definitions was considered. Pelling (2003) considers social resilience as an idea of urbanization and risk, a spontaneous or predetermined adjustment in response to a sense of danger, including relief and rescue. Cutter *et al*., (2008) consider social resilience as the ability of a social system to respond to and rebuild after the hazards, and include conditions that allow the system to absorb effects and adapt to events, and post-traumatic adaptation processes that Uses the ability of the social system to easily reorganize, change, and learn to respond to risk. As the definitions suggest, both researchers focus on the capacity to anticipate, prepare for risk, and learn social actors and the social system in order to better deal with future risks.

Research Background

Akbari (2018) in an article entitled "The study of urban social resilience with the study of Ilam city" has concluded that social resilience in Ilam city is at an undesirable level. Also, among the selected neighborhoods, Saadi neighborhood with an average rank of 1.10 has the highest resilience and Banbarz neighborhood with an average rank of 1.46 has the lowest social resilience. Roosta *et al*., (2018) in an article entitled "Assessing the rate of urban social resilience" by examining the city of Zahedan found that, inappropriate mental atmosphere in urban areas of Zahedan (especially in Districts 3 and 4) and endangered the development of these areas and caused vulnerability and lack of social resilience in the city and, consequently, social security, inappropriate mental space is the threat to the resilience of the city. Ahmadinia (2017) in a dissertation entitled "Resilience in the old and new neighborhoods of Tabriz metropolis" concluded that, physically, resilience is desirable in more than half of Valiasr neighborhood, while only 30% of Shotorban neighborhood Has desirable physical capacities to withstand earthquake resistance; Therefore, the most and the least differences in these neighborhoods have been in the economic and social fields, respectively. Partovi *et al*., (2016) in a study entitled "Urban design and social resilience by examining Jolfa neighborhood of Isfahan" found that, considering the factors of quality of living environment, identity, flexibility, learning, central justice (inclusiveness) and improving communication between residents together with residents and officials, it promotes social resilience in urban design. Zaker Haghighi and Akbarian (2015) in an article entitled "Deductive analysis of social resilience in historical-residential

areas and the development of a strategic-operational plan by examining the neighborhoods of Burj Ghorban and Charchereh in Hamadan" concluded that the strategy adopted based on assessing the internal and external factors of historical-residential neighborhoods of Hamedan is an aggressive strategy; Accordingly, the existing capabilities of historical-residential neighborhoods and the opportunities ahead should be used effectively to increase the resilience of neighborhoods. "Urban resilience measurement indices" is the title of a study conducted by Schlör *et al*., (2017) and concluded that the ability to meet challenges depends significantly on the resilience of the urban area, which is largely aimed at by institutions. Protecting social cohesion and minimizing environmental pressure, and urbanization has put pressure on social cohesion by increasing social vulnerability and the adverse impact of marginalization. Justice and equality are basic preconditions for the evolution of resistance urban concepts and should be consider a comprehensive management approach. Suárez *et al*., (2016) conducted a study entitled "Towards urban social resilience indicators", which provides a framework for measuring urban resilience indicators and its application in the provincial centers of Spain as a case study. Research shows that most cities are far from social resilience. Therefore, in order to achieve resilience, measures such as reducing resource consumption, promoting local experiences, creating an atmosphere of citizen participation and diversifying the local economy in the study areas should be increased. Wikström (2013) has conducted a study entitled "The challenge of planning changes for urban social resilience. The purpose of this study is to analyze the goals of contemporary planning and methods of adaptation and resilience of social change in cities. The findings of this study show that urban resilience is in line with social change with social capital and social cohesion. The current study has been carried out in Karaj in 2020).

MATERIALS AND METHODS

The present study is a descriptive-analytical study which have been performed in two forms: documentary-library studies and the use of a questionnaire. Thus, in order to clarify the literature on the subject of research and compile theoretical foundations, as well as research records, theoretical studies have been used, which have been written by referring to libraries and using books, dissertations and articles. In the survey method, a questionnaire was used. In the survey method, a questionnaire was used. The questionnaire was used as a data collection tool that contained a number of open and closed questions related to the research topic. The validity of the questionnaire was obtained by the opinions of professors and experts and the reliability of the questionnaire due to the use of Likert scale in the questionnaire was obtained by Cronbach's alpha in SPSS software with a value of 0.85%. SPSS and LISREL software were used for data analysis. The structural equation model has been used to test the conceptual model of the research. The statistical population includes citizens of District one of Karaj city and the sample size adapted from Cochran's formula is 384 people

Geographical location of the study area

Karaj city with a longitude of 51 degrees and 0 minutes and 30 seconds east and a latitude of 35 degrees and 48 minutes and 45 seconds north (Karaj historical bridge, entrance of Karaj-Chalous road), with an altitude of 1297 meters above sea level (railway station) , Is located 48 km northwest of Tehran. This city with an area of 175.4 square kilometers and an surroundings of 178.9 square kilometers is located at the foot of the Central Alborz mountain range and is the center of Karaj city and Alborz province. District 1 of Karaj is located in the geographical coordinates of 35 degrees and 49 minutes north latitude and 51 degrees and 1 minute east longitude, in the northeast of Karaj city. The eastern part of the region is mostly mountainous, which is actually part of the Alborz mountain range; and the western part of it is plain and semi-plain. This part of Karaj city is located at the foot of Alborz Mountains, and for this reason, compared to other districts of the metropolis, it has uneven surfaces and sometimes steep slopes (Fig. 1). The population of this district in 2016 was estimated, 145,041 people (fourth place in the city).

RESULTS AND DISCUSSIONS

The descriptive findings of the study show that in terms of gender, 151 people (39.3%) are men and 233 people (60.7%) are women. Also in terms of age, 47 people (12.2%) are under 25 years old, 135 people (35.2%) are between 26-35 years old, 117 people

Table 2: Description of research variables based on mean and standard deviation

Variables		Number of items	Theoretical average	Obtained average	Standard deviation
social Solidarity		17	51	45.32	5.45
social solidarity	Trust	6	18	16.89	2.51
	Social capital	5	15	13.30	2.37
	Commonalities between residents	6	18	13.50	2.62
Resilience		7	21	18.12	3.21

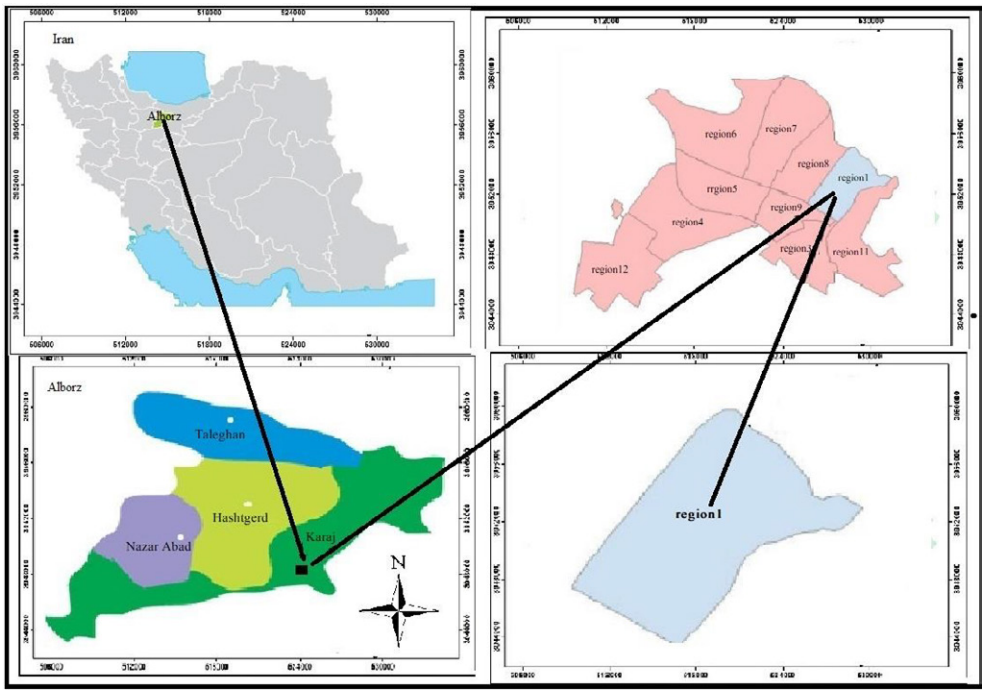

Fig. 1: Geographical location of the study area

(30.5%) are between 36 and 45 years old, and 85 people, equivalent to 22.1%, were over 46 years old. In terms of education, 171 (27.9%) were illiterate and low-literate and 152 (39.6%) had a diploma, 92 (24%) had a bachelor's degree, 30 (7.8%) had a master's degree and 3 (8/8%) had a doctorate.

Description of research variables

Due to the need to have an overview of the status of research variables based on respondents' responses, Table 2 describes the research variables based on mean and standard deviation to measure their status relative to the theoretical average of the questionnaire.

Based on the information in Table 2, it is considered; the mean of social cohesion is lower than the theoretical mean (51 >35.32). Also, the average of components of social cohesion such as trust is lower than the theoretical average (18>16.89). The average component of social capital is lower than the theoretical average (15>13.30). The average component of commonalities between residents is lower than the theoretical average (18>13.50), and the average resilience is lower than the theoretical average (21>18.12).

Measurement model

In this study, a questionnaire was used to collect data. Therefore, using confirmatory factor analysis, the general structure of research questionnaires has

Table 3: KMO and Bartlett test for questionnaire questions

KMO Test	0.676
X Test	2650,024
df	383
Sig	0,000

been validated. In order to assess the validity, there are various methods that in this study, considering that the research variables are composed of several dimensions (components), the confirmatory factor analysis test have been used. In performing factor analysis, it must be ensured whether the available data can be used for analysis or not. In other words, is the number of data required for factor analysis is appropriate or not. For this purpose, KMO index, "Kaiser-Mir-Olkin sampling adequacy index" and Bartlett test were used. Based on these two data tests, they are suitable for factor analysis when the KMO index is greater than 0.6 and close to one and the sig Bartlett test is less than 0.05. The output of these tests is presented in Table 3.

According to Table 3, the values of KMO and Bartlett index and its significance are reported. KMO indices and Bartlett test are used to check the appropriateness of the amount of data in the analysis. KMO is used to determine the adequacy of the number of samples, which is suitable if it is more than 0.6 and not suitable if it is less than 0.6. The KMO index was equal to 0.676 and above the value of 0.6, which is an acceptable figure and indicates that the selected sample is sufficient to perform factor analysis. Bartlett examines whether the correlation matrix is a single matrix or not. If the matrix is equal to one, there is no significant relationship between the variables, i.e. new factors cannot be identified based on the correlation of the variables. Bartlett index is significant in examining the adequacy of the matrix at the level of P <0.01 (error level). In this sense, the obtained matrix is sufficient and the data of this research have the ability to be factorized. This allows factor analysis to be performed.

Confirmatory factor analysis of data

To enter the structural equations, research tools must be validated to determine the validity of the structure, therefore factor analysis is used to confirm the variables and their related items. In this model, in which the researcher begins the research with a previous hypothesis and is based on an empirical foundation, the correlated factors are determined. Also, in order to investigate the hypotheses raised in the research and the relationship between each of the factors and the significance of the research model, the path analysis method is used based on factor analysis of data.

Confirmatory factor analysis of the second order of social solidarity

The basic structural model for the quality management index is shown in Fig. 2. The strength of the relationship between hidden variables and visible variables is indicated by the factor load, which is less than 0.3 is weak relation, factor load between 0.3 to 0.6 acceptable ratio and factor load greater than 0.6 is very desirable. Social capital has 3 sub-criteria of trust, social solidarity, and commonalities between residents. The factor load of these three variables on social capital are 0.24, 0.83 and 0.91 respectively, which is shown in Fig. 2. Trust, has 6 questions with loads of 0.16, 0.11, 0.16, 0.26, 0.25 and 0.70; Social solidarity, has 5 questions with loads of 0.11, 0.41, 0.53, 0.07 and 0.02 (delete questions 16 and 15); The commonalities between the residents have 6 questions with loads of 0.45, 0.67, 0.41, -0.05, 0.19 and 0.17 (delete question 21), all of which are acceptable and approved coefficients.

The output of T-coefficients in the social capital component is shown in Fig. 3. The output of T-coefficients for the trust component is 2.53, 1.73, 2.52, 4.14, 4.01 and 8.86, all coefficients higher than 2.59 except the coefficient of question 2 (non-natives and immigrants are living in Our neighborhood) was at the significance level of 0.01 (T-coefficients were between 1.96, 2.58 at the 0.05 level and trust coefficients were higher than 2.85 at the significance level of 0.01). The value of the t-coefficient was 1.73 only in question 2. For the social solidarity component, the T-coefficient was equal to 1.65, 6.14, 7.03, -1.01, -0.35, all coefficients were higher than 2.59 for questions 12, 14 and 15 at the significance

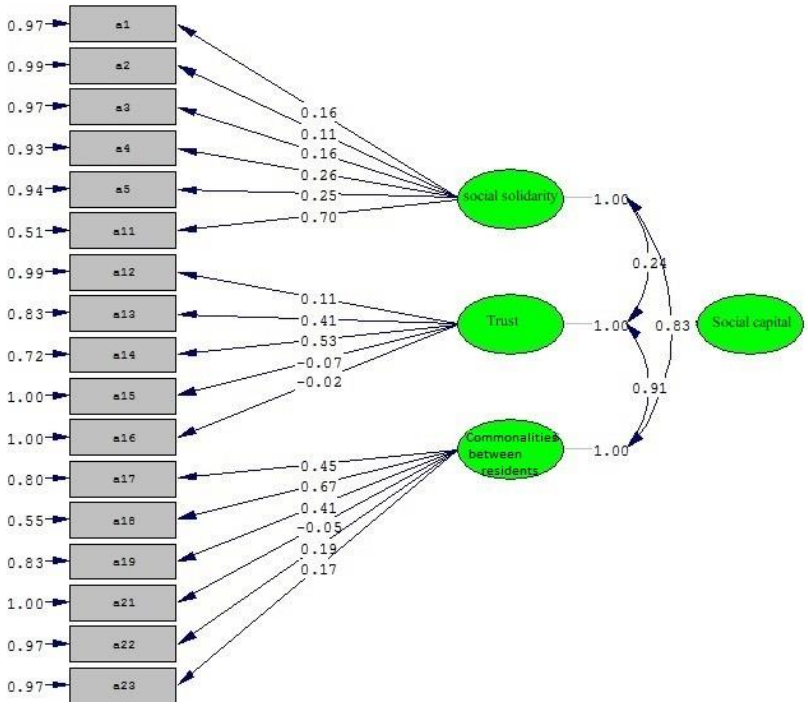

Fig. 2- The output of the coefficients of the second order factor analytical model of social capital

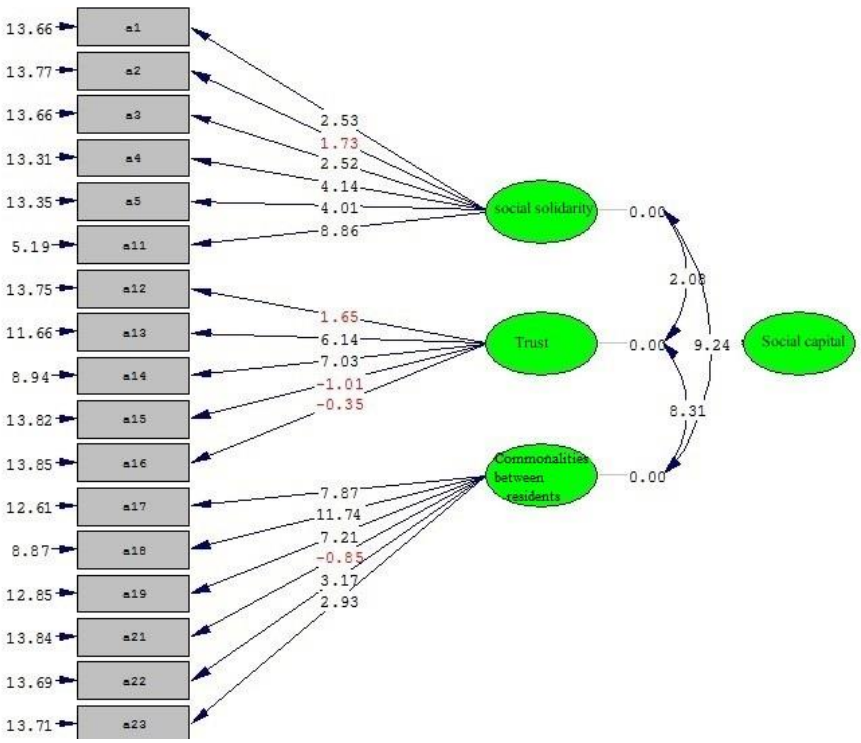

Fig. 3: The output of the coefficients of the second order factor analytical model of social capital

Table 4: General fit indicators of the tested model of social capital

Characteristic	Estimation	Criterion
Chi-square ratio to the degree of freedom	1.002	/df>3x^2
Root Mean Square Error of Approximation (RMSEA)	0.009	0<RMSEA<0.08
Goodness of Fit Index (GFI)	0.79	0.9 <GFI < 1
Adjusted Goodness of Fit Index (AGFI)	0.75	0.9 <AGFI < 1
Comparative Fit Index (CFI)	0.87	0.9<CFI < 1
Adjusted Goodness of Fit Index (AGFI)	0.63	0.9<NFI < 1

level of 0.01. (Trust coefficients ranged from 1.96 to 2.58 at the 0.05 level and trust coefficients were higher than 2.85 at the significance level of 0.01). Only in questions 12 (Do you help to strengthen trust among neighbors), 14 (Do you trust your neighbors in times of problems and crises), 15 (Does your family feels identity and belonging to the neighborhood), Trust had the lowest coefficients of 1.73, -1.01, -0.35 and 1.65. For the component of commonalities between the residents, the coefficients showed 7.87, 11.74, 7.21, 0.17-1.85, 2.93, respectively in which that all coefficients were higher than 2.59 (except the coefficient for the question 21) in the level of significance was 0.01 (trust coefficients between 1.96. 2.58 at the level of 0.05 and trust coefficients above 2.85 at the significance level of 0.01) and only regarding question 21 (people in the neighborhood in case of having a request or a problem, they can convey their request to the authorities), trust had the lowest value of -0.85 coefficient.

The general characteristics of the tested model of social capital are given in Table 4. The criteria of goodness of fit index and adjusted fit index indicate that the model has a moderate fit. Also, the results of Fig. 3 show the appropriateness of factor loads of indicators (questions) related to each component and also at a relatively appropriate level, and there is a factor load of each component as an indicator of social capital in predicting this variable.

As it can be observed in Table 4, the Goodness of Fit Index in the social capital model is calculated to be 0.79, which according to the estimate made for the Goodness of Fit index, the closer the values obtained to 1, the more acceptable the fit model is. To adjust the weight, the adjusted Goodness of Fit Index was used. The adjusted Goodness-of-Fit Index adjusts the Goodness-of- Fit of the model in relation to the sample size and degrees of freedom of the model, which, like the Goodness-of-Fit Index, fluctuates between 0 and 1. Each structure is rated at a relatively good level. So that the root means of the index of the mean power of the approximation error for all sub-components of social capital is less than 0.07, the Comparative Fit Index is 0.87 and the Adaptive Fit Index is 0.63, which indicates that the closer it is to 1, the more acceptable and relatively fit moderate-good model.

Confirmatory factor analysis of the second order of resilience

The basic structural model for the resilience index is shown in Fig. 4. The strength of the relationship between the hidden and the visible variables by the factor load shows that the factor load of less than 0.3 is a weak relation, the factor load between 0.3 to 0.6 is acceptable and the factor load greater than 0.6, is desirable. The resilience did not have any sub criteria. Therefore, accuracy in the operating loads of this variable shows that all factor loads and their output were more than 0.3, which indicates that all items are acceptable and approved.

Accuracy in resilience output also showed that all resilience coefficients were higher than 2.58 at the significant level of 0.01, which indicates that the coefficients are confirmed. The accuracy of the outputs also showed that in all 20 items (People in the neighborhood agree on controlling and solving neighborhood problems), 6 (In our neighborhood, people are sometimes harassed outside the home), 7 (If a car is parked in the alley at night, it will be stolen), 8 (In our neighborhood, people move around alone during the day and night), 9 (Does not leave the house for a long time due to theft) and 10 (Access to police in our neighborhood is easily possible), 24 (Access to recreation and welfare centers is easy), all coefficients were higher than 2.58 but only in question 8 (In our neighborhood, people move around alone during the day and night), the fit factor was low (Fig. 4).

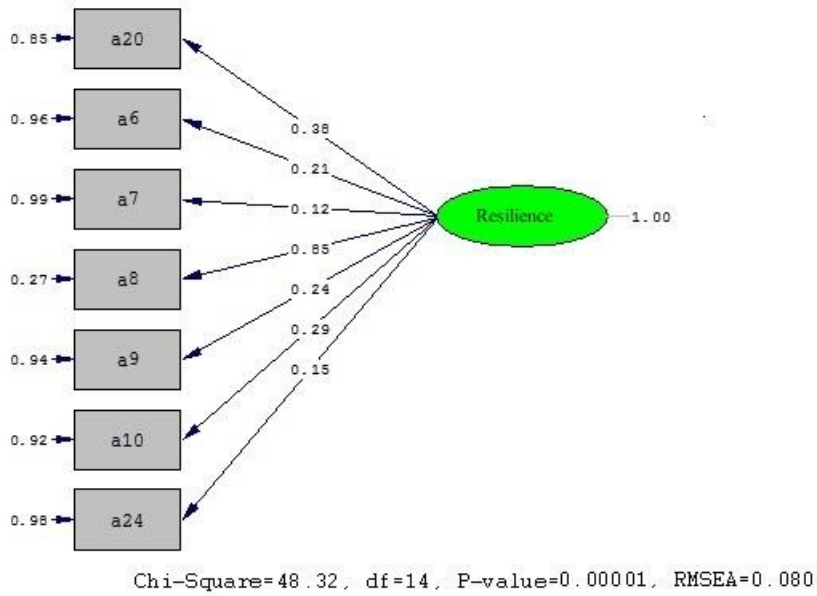

Fig. 4: The output of the coefficients of the second-order resilience factor analytical model

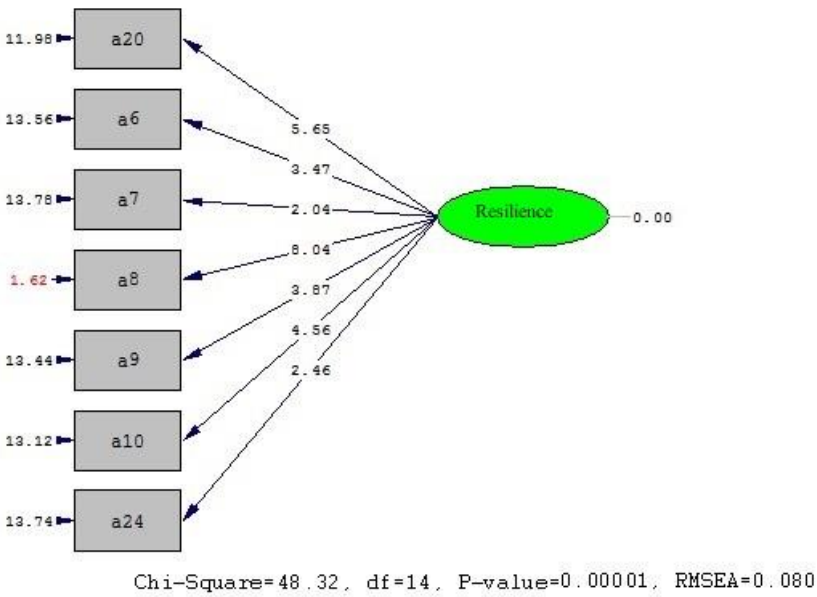

Fig. 5: Output of coefficients of the analytical factor analysis model

The general characteristics of the tested resilience model are given in Table

As it can be seen in Table 5, the Goodness-of-Fit Index in the resilience model is calculated to be 0.448. According to the estimate made for the Goodness-of-Fit Index of the model, the closer the values obtained to 1, the better and acceptable model fit is. The Adjusted Fitness Index was used to adjust the weight. The adjusted Goodness-of-Fit Index adjusts the Goodness-of-Fit Index of the model in relation to the sample size and degrees of freedom of the model, which, like the Goodness-of-Fit Index,

Table 5: General fit indices of the tested resilience model

Characteristic	Estimation	Criterion
Chi-square ratio to the degree of freedom	1.004	/df>3x^2
Root Mean Square Error of Approximation (RMSEA)	0.408	0<RMSEA<0.08
Goodness of Fit Index (GFI)	0.448	0.9 <GFI < 1
Adjusted Goodness of Fit Index (AGFI)	0.270	0.9 <AGFI < 1
Comparative Fit Index (CFI)	0.757	0.9<CFI < 1
Adjusted Goodness of Fit Index (NFI)	0.451	0.9<NFI < 1

Table 6: Results of Pearson-Social Capital Test on Social Resilience

cohesion	Social Resilience
Social capital	0.350
Sig: 0.000	

Table 7: Results of correlation test (Pearson) for social capital and social resilience dimensions

Social resilience		The amount of correlation	Significance level
Resilience dimensions	Trust	0.448	0.000
	Social cohesion	0.263	0.000
	Commonalities between residents	0.298	0.000

fluctuates between 0 and 1. Each of the structures is evaluated at a relatively good level so that the root mean of the mean power of the approximate error for all the subcomponents of resilience is less than 0.07. The closer it is to 1, the fit of the model would be average and acceptable.

Test the hypotheses

Hypothesis 1: It seems that there is a relationship between social capital and social resilience in region one of Karaj city.

The findings of Table 6 show that the relevant statistical activities indicate that there is a significant relationship between social cohesion and social resilience in District 1 of Karaj city (sig = 0.000). The positive relationship directions indicate that as the social capital increases, social resilience will increase too in District 1 of city of Karaj. That is, for the amount of r= 350 when added to social capital, the value of r=350 is added to the social resilience.

Hypothesis 2: There is a relationship between the dimensions of social capital and social resilience in District 1 of city of Karaj.

The findings in Table 7 show that the relevant statistical activities indicate that there is a significant relationship between the dimensions of social cohesion and social resilience in District 1 of Karaj (Sig. = 0.000). The positive relationship direction indicates that to the extent that the dimensions of social capital, trust (0.448), social cohesion (0.263), commonalities between residents (0.298) increases, social resilience also increases in District 1 of Karaj city.

Results of multivariate regression analysis of social resilience

Investigating the effect of social capital and social resilience in region one of Karaj city

The precondition for using regression is the non-multicolinearity assumptions and error independence:

Lack of non- multicolinearity (tolerance parameter)

Co-linearity is a state in which there is a strong correlation between two predictor variables. Multiple multicolinearity is a state in which more than two

Table 8: Multicolinearity regression test and error independence

Model		Tolerance statistics	Durbin-Watson Test
Social capital	Trust	0.891	
	Social cohesion	0.930	1.961
	Commonalities between residents	0.898	

predictor variables are strongly correlated with each other. Multicolinearity can distort the interpretation of multiple regression results (Kalnins, 2018). When more than two variables are considered, the non-multicolinearity parameter is used. This parameter allows this method to be protected against multicolinearity hazards by expelling predictor variables that are highly correlated with other independent variables. Conceptually, the tolerance parameter is the amount of variance of the predictor variable that is not explained by other predictor variables. The range of values of the tolerance parameter is from 0 to 1 and the lower values of the tolerance parameter show that there is a stronger relationship between the predictor variables (Kalnins, 2018). The closer the value of the tolerance parameter is to 1, the lower the probability of multicolinearity would be. It should be noted that the tolerance parameter is provided for all predictor variables and the tolerance parameter of each variable should be evaluated separately.

In Table 8, the results of the tolerance statistics column show the coherence of independent variables. According to the obtained results, the amount of tolerance statistics among the 3 independent variables is more than 0.4 and the minimum value of tolerance statistics is equal to 0.891. The results show that the degree of co-linearity between the independent variables is not a concern.

Error independence (Durbin-Watson)

Another assumption required for regression analysis is that the value of one observation is not too specific to the value of another observation. When data is collected consecutively, not being independent can be a serious problem, therefore in this situation the Durbin- Watson test can be used. The value of this statistic varies between 0 and 4. If there is no correlation between consecutive residues, the value of the Watson camera statistic should be close to 2, and if the value of this statistic is close to zero, it indicates a positive correlation between consecutive residues. If the value of this statistic is close to 4, it indicates a negative correlation between consecutive observations. As a general rule, if the Durbin-Watson observed value is between 1.5 and 2.5 it indicates the independence of the observations, which according to Table 9, the value of the Durbin-Watson is equal to 1.961. To show the effect of the contribution of each of the independent variables on the dependent variable of social resilience in the present study, stepwise multivariate regression analysis has been used. In order to estimate the effect of the contribution of each of the independent variables on the dependent variable of social resilience in the present study, stepwise multivariate regression analysis has been used. The results of regression show that the relationship between independent and dependent variables based on one-way analysis of variance is linear with respect to the level of significance obtained and show that the set of independent variables can explain the changes of social resilience dependent variable and thus the regression model is confirmation.

The correlation coefficient (R) is the dimensions of the variables of social cohesion, trust (0.448), social capital (0.263), commonalities between residents (0.298), which shows that there is a high correlation between the set of independent variables and the dependent variable; The value of the adjusted coefficient (R2), which is equal to 0.503, shows that 50% of the changes in the social resilience variable are explained by the remaining variables in the regression model which include the variables of trust, social capital, commonalities between residents. All remaining variables in the model are directly related to the dependent variable. Among these, the level of trust has had the greatest impact on the social resilience variable of District 1 of Karaj city.

The correlation coefficient (R) is the dimensions of the variables of social cohesion: trust (0.448), social capital (0.263), commonalities between residents

Table 9: Multivariate regression analysis statistics of social resilience

Variables		Beta	T Value	Sig	Analysis of variance		Multiple correlation ®coefficient	Coefficient of determination(2)	Modified Coefficient of determination	Standard Error of Estimate
					F Value	Sig				
Social Capital	Trust	0.448	9.792	0.000	95/89	0.000	0.448	0.201	0.199	2.87
	Social cohesion	0.263	5.338	0.000	28.49	0.000	0.263	0.069	0.067	3.10
	Commonalities between residents	0.298	6.095	0.000	37.155	0.000	0.298	0.089	0.089	3.07
	Total				42.87	0.000	0.503	0.253	0.247	2.78

(0.298), which shows that there is a high correlation between the set of independent variables and the dependent variable. The value of the adjusted coefficient (R2), which is equal to 0.503, shows that 50% of the changes in the social resilience variable are explained by the remaining variables in the regression model which include the variables of trust, social capital, commonalities between residents. All remaining variables in the model are directly related to the dependent variable. Among these, the level of trust has had the greatest impact on the social resilience variable of District 1 of city of Karaj. The type of attitude towards resilience and the way it is analyzed play a key role in how resilience is identified and its causes, and influence risk reduction measures. For this reason, resilience against threats and reducing its effects is of great importance given the results it will have and the emphasis that this analysis has on the resilience dimension. Trust with 6 questions with loads of 0.16, 0.11, 0.16, 0.26, 0.25 and 0.70; Social capital, with 5 questions with loads of 0.11, 0.41, 0.53, 0.07 and 0.02; communalities between residents with 6 questions with loads of 0.45, 0.67, 0.41, -0.05, 0.19 and 0.17 have acceptable and approved coefficients. The output of T-coefficients is in the social cohesion component. The output of t- coefficients for the trust component are 2.53, 1.73, 2.52, 4.14, 4.01 and 8.86, all coefficients above 2.59 at the significance level of 0.01 (Trust coefficients between 1.96, 2.58 at the level of 0.05 and coefficients above 2.85 at the significance level are 0.01). The output of T-coefficients for the social capital component are 1.65, 6.14, 7.03, -1.01 and -0.35, all coefficients are higher than 2.59 (14, 15) at the significance level of 0.01 (Trust coefficients are between 1.96 and 2.58 at the 0.05 level and trust coefficients are higher than 2.85 at the significance level of 0.01). The output of T-coefficients for the component of commonalities between residents is 7.87, 11.74, 7.21, 0.17-1.85 and 2.93, all coefficients are higher than 2.59 at the significance level of 0.01 (Trust coefficients between 1.96 and 2.58 at the level of 0.05 and T-coefficients above 2.85 at the significance level of 0.01). The structural model of social cohesion, the criteria of goodness-fit index and the adjusted fit index were equal to 0.79, which indicates that the model has a moderate fit. Also, the confirmation factor analysis of the second order of resilience shows that all coefficients of resilience are higher than 2.58 at the significant level of 0.01, which indicates that the coefficients are approved. The criteria of goodness of fit index and adjusted fit index of 0.448 indicate that the model has a moderate fit. According to the results of the statistical tests of the research and also according to the theories presented in the current research, social resilience enables people to work together to achieve common goals, also people are able to communicate with each other and together they will be able to do things that they are not able to do individually. The most important functions of the capital component and social resilience are to reduce crime and problems, and increase security and peace of mind. In such a situation, relying on common values and norms resulting from social capital, a sense of security, trust, mutual commitment, participation and cooperation of members of society to access mutual resources, which is social resilience, is provided. According to the research findings, increasing motivation to raise social awareness, expanding adherence to generalized norms, strengthening social cohesion and solidarity, and increasing areas of citizen participation and social trust of citizens can lead to increased

resilience in the social dimension. The results of the present study are in line with the results of Godschalk (2003), who believes that trust between people in a community and the relationships between them can help the increase of social cohesion. The results of the present study are also consistent with the results of Twigg (2007) research, which concluded that resilience is a function of an individual's interaction with changes in the environment over time and the degree of resilience between humans, Cultures, geographical conditions, religions and organizations, etc. are different. The results of the present study are also in line with the results of the Kimhi Shamai (2004) study, which states that the degree of social participation in the face of events, measuring the degree of social solidarity in the current conditions of metropolises and measuring ongoing programs regarding possible reactions of citizens to increasing resilience and helps building the communities.

CONCLUSION

Cities are complex and interdependent systems and are highly vulnerable to natural, man-made and terrorist threats. Resilience has different dimensions such as social, economic, political, physical and cultural resilience. The purpose of this study was to investigate and measure the criteria of social resilience among the four dimensions of resilience in the settlement. The concept of social resilience is defined as the ability of communities to adapt to stress and turmoil, to perform recovery activities to reduce social disruption. The present study is a descriptive-analytical study that is in the form of documentary-library studies and the use of a questionnaire. In this research, a questionnaire, which its validity was confirmed by the experts and the scholars, was used as a data collection tool that contained a number of open and closed questions related to the research topic. The reliability of the questionnaire was 0.85% by Cronbach's alpha in SPSS software due to the use of Likert scale in the questionnaire. SPSS and LISREL software were used for data analysis. The structural equation model has been used to test the conceptual model of the research. The results showed that the confidence component was 2.53, 1.73, 2.52, 4.14, 4.01 and 8.86 that all coefficients were higher than 2.59 at the significance level of 0.01. For the social capital component was 1.65, 6.14, 07.03, -1.01, and -0.35, which showed that all coefficients were higher than 2.59 at the significance level of 0.01. For the component of commonalities between residents component was 7.87, 11.74, 7.21, 0.85-1.17, 2.93, showing that all coefficients were higher than 2.59 at the significance level of 0.01. Also, the structural model of social cohesion, the criteria of goodness of fit index and the adjusted fit index were equal to 0.79, which indicates that the model has a moderate fit. The results of regression show that the relationship between independent and dependent variables based on one-way analysis of variance is linear with respect to the level of significance obtained and show that the set of independent variables can explain the changes of social resilience dependent variable and thus the regression model is confirmation. Also, the confirmation factor analysis of the second order of resilience shows that all coefficients of resilience are higher than 2.58 at the significant level of 0.01, which indicates that the coefficients are approved. The criteria of goodness of fit index and adjusted fit index of 0.448 indicate that the model has a moderate fit

Suggestions

- Improving the residential satisfaction In the District 1 of Karaj city, which increases social resilience;
- To provide empowerment, social, educational and cultural programs to improve the resilience and living and cultural level of citizens by the district Municipality;
- Creating social security and eliminating crime grounds by strengthening the neighborhood-oriented spirit;
- Increasing the level of trust and cooperation between residents and city officials through the presence of officials in different gatherings of local people in order to solve the problems of the region district;
- Prevent migration to strengthen district and social cohesion.

AUTHOR CONTRIBUTIONS

E. Jalalian prepared theoretical foundations and introduction, E. Nasiri Hendeh Khaleh prepared the analysis of research findings and research methodology, N. Ezadbin Prepared the abstract and performed the data collection and summarizing and concluding the research.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancy has been completely observed by the authors.

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