Assessing the Level of Social Resilience in District 9 of Tehran Metropolis

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Abstract
Due to the increase in the occurrences of natural disasters in cities and the resulting casualties and socio-economic and physical damages, the local authorities are attempting to find approaches and adopt policies to increase the resilience of cities in order to withstand these calamities. Therefore, resilience has become one of the important issues to attend in order to minimize the vulnerabilities of cities. Because of the presence of some of the important city infrastructures in District 9 of Tehran Metropolis, it is selected as a case study to assess the different domains of social resilience in its different neighborhoods, their spatial distribution, and also to find out if there is any difference between the levels of the social resilience among the neighborhoods of this district. Reviewing the literature and considering the special condition of District 9, five domains of social resilience were identified: Social Capital, Social Values, Social Structure, Equality and Social Diversity, and Social Beliefs and Culture. The indicators depicting these different domains were also extracted from the literature. A questionnaire containing 32 questions was designed to collect the needed data for evaluating the applicability of the extracted conceptual framework for assessing the social resilience of the neighborhoods of district 9 of Tehran metropolis. Systematic sampling was used to collect the 106 questionnaires required for the purposes of this study. Exploratory factor analysis was adopted to extract the underlying factors of each social resilience domain and to identify their corresponding indicators. The findings of the study show that the Social Capital domain is composed of three factors: social cohesion, social support, and social participation; the Social Values domain is composed of three factors: sense of belonging to the community, social awareness, and social capability; the Social Structure domain is composed of three factors: community dynamism and empowerment, demographics, and the level of education; Equality and Social Diversity domain is composed of three factors: access to safe and secure space in times of disaster, access to basic services, and access to educational services; and Social Beliefs and Culture domain is composed of two factors: social beliefs and social culture. Each of these factors are represented by a number of indicators. A composite social resilience index was computed to assess the level of social resilience of each neighborhood. In order to find the difference between the levels of social resilience among the 7 neighborhoods of District 9, a one-way ANOVA test was conducted. The results of the study show that, in terms of social resilience, there exist no difference among the 7 neighborhoods of the district 9; social resilience in the neighborhoods of the district is very low, and the two domains of equality and social diversity, and social beliefs and culture are the lowest.

Keywords: Social Resilience, District 9 of Tehran Metropolis, Social resilience domains, Social resilience indicators.

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Introduction

According to studies, despite increasing advances in science and technology, the frequency of natural disasters has not been reduced, but the number of human and physical casualties and losses has increased. Nowadays, local communities are trying to find solutions that can help them return to normal or pre-crisis status more quickly after an accident or crisis. Therefore, in recent years, special emphasis has been placed on the subject of resilience. This concept is widely used today in various sciences such as social sciences, geography, economics, psychology, environmental sciences, urban planning and also interdisciplinary sciences. Resilience is generally a measure of a system's ability to absorb change while still having previous resistance. Given the growing population of cities and the fact that they are always threatened by dangers, the question arises as to how to measure the resilience of communities in times of crisis.

Tehran is located in the foothills of the Alborz Mountains, which is part of the Alpine-Himalayan orogenic zone with high seismic potential and many active faults (Jayka, 2000). In recent decades, risk management has been changed, and the mere focus on reducing vulnerability has given way to increased resilience to disasters. Moreover, it is understood that the main risk factors are human and social vulnerabilities. Therefore, risk reduction programs should seek to build and strengthen resilient communities. The metropolis of Tehran, with a population of more than 8.5 million and many dilapidated areas, is prone to all kinds of hazards and is highly vulnerable to natural disasters. Due to the significance of District 9 in this metropolis, assessing the social resilience of this area to natural hazards is very important.

This study was conducted to answer the following questions: What are the indicators and domains of social resilience in District 9 of Tehran? What is the spatial distribution of social resilience in the neighborhoods of District 9 of Tehran? And whether there is a significant difference between the neighborhoods of District 9 of Tehran in terms of social resilience or not?

This article consists of the following sections: Following the introduction, there is a review of the theoretical and experimental texts of social resilience. After that, considering the special conditions of District 9 and the metropolis of Tehran, a conceptual model of the study has been extracted and presented. Then, the paper elaborates on the research method and the manner of selecting samples and collecting data. In the section of argument and analysis, adopting the method of factor analysis, results were studied. Finally, a conclusion of findings is presented.

Literature Review

In this part of the study, theoretical and experimental texts, frameworks and conceptual models related to the social resilience have been studied in order to extract the domains and indicators of social resilience and to develop a conceptual model of the study considering the conditions of Tehran metropolis.

In order to evaluate the effects of collective identity and memory on social resilience in the city of Bam after the 2003 earthquake, Aslani and Amini Hosseini used the grounded theory and identified the domains of social resilience as follows: demographic characteristics, education and awareness, vulnerable groups, social counseling, justice, equality and unity, dependency, flexibility, community experiences and social capital (Aslani and Amini Hosseini 2008). In a study conducted in New York City, McMillen et al. considered the operating indicators of social resilience and tried to examine and determine its relationship with governing practices on the maintenance and protection of the urban environment (McMillen et al, 2016). The maintenance and protection of the urban environment in this study refers to the act of protecting parks, greenspaces and gardens, planting trees, and collecting garbage from neighboring parks. It also refers to the domains of social resilience, spatial dependence, collective identity, social cohesion, diversity, and social networks (Table 1).

Row	Author	Subfactors of Social Resilience	**Indicators of social resilience**
1	(Aslani and Amini Hosseini, 2019)	Demographic characteristics	Population density, population growth rate, indigenous population, population under 6 and over 65 years
		Education and awareness	Level of education, skills, knowledge and information
		Vulnerable groups	Sick and disabled population
		Social counselling	Level of social counseling
		Justice	Social justice
		Equity and unity	Language, race and ethnicity
		Dependency	Social dependance
		Flexibility	Accident adaptation capacity
		Community experiences	Experience of previous disasters and lessons learned from them
		Social capital	Social communication, social participation, social security, social dynamism, sense of place, trust, religious followers
2	(McMillen et al, 2016)	Place dependency	Signs, diversification of meanings in an area, supportive local responses
		Collective identity	Holding local ceremonies
		Social cohesion	Collaboration, participation in collective activities
		Social networks	Communication with sites outside the neighborhood / community
		Knowledge exchange and diversity	Exchange of knowledge and local experiences
3	(Kwok et al, 2016)	Skills, abilities and knowledge	The ability to turn risk into practical local knowledge, collaborative capabilities, the ability to solve problems, the diversity of skills, trained personnel, leadership, understanding the need for being prepared
		Social qualities and facilities	Social cohesion, economic resilience, existence of green spaces, a place for gatherings and social networks
		Social values and understanding	Social support, trust, shared beliefs, honors and inclusiveness
		Social processes	Planning (local planning), frameworks for cooperation, a process of sharing opinions and ideas to solve problems, connection between different groups of the society
4	(Khalili et al, 2015)	Sense of belonging	Sense of social belonging
		Trust	Having trust in neighbors and other members of the society
		Social participation	Social participation
		Leadership	Social leadership
		Collective effectiveness	Sharing collective beliefs to change the society
		Social effectiveness	Social confidence in its own abilities
		Social capital	Using social networks and having the capital, assets and the access of doing so
		Social unity	Social spirit of cooperation
		Social cooperation	Information and communication
		Social support	Supporting neighbors
		Learning	Learning from previous disasters
		Education	Level of knowledge and perception about disasters
		Demographic characteristics	Age, gender, social standing, level of income, health, education, people with special needs
		Manner of copping	Capacity of strategic development and adaptation
5	(Saja et al., 2019)	Demographic characteristics	Age, gender, social standing, level of income, health, historic profile, job/employment, level of literacy, people with special needs (the elderly, the disable and widows)
		Social cohesion	Social capital, social trust and volunteering
		Social networks	Civil participation in social networks, social associations, social systems, connection between different groups
		Social participation	Political and religious participation
		Social values	Sense of belonging, social participation
		Access to health services	Access to health services (facilities and first aid cares)
		Social capabilities	Local knowledge and understanding of risk
6	(Saja et al.,2018)	Social structure	Demographic characteristics: age, gender, density, people with special needs Household structure: social standing, income, health, literacy Possibility of relocation: Ownership of lands and properties, access to transportation system, traffic system
		Social capital	Social cohesion: Social trust, leadership, intergroups relationships Social support: social support system, assets and collective experiences Social networks: Civil participation in social networks, efficient civil organizations, volunteering
		Social mechanisms/capabilities/values	Social goals and capacities: Collective capacity, strategy, goals and priorities Social values and attitudes: Sense of belonging, shared values and beliefs, traditional adaptation mechanisms Social processes: planning, frameworks of cooperation, decision-making and cooperative solutions Social capacities: Local risk perception and knowledge, previous experiences about post-disaster recovery
		Social equality and diversification	Fair access to basic services and needs: health and welfare, education and resources Inclusiveness and equity: Ethnic equities and participation of different groups, participation and equity for those with special needs, gender equality Diverse workforce: different skills and trained personnel, different workforce in different places, access to different workforce
		Social culture/beliefs	Local and cultural beliefs: Cultural and behavioral norms, cultural and historic security Religious beliefs: religious operations
7	(Chun et al., 2017)	Humanities	Density, age, ethnic inequalities, foreigners, the disabled, the poor, education
		Social	Social support, political force, penalties/security, health, welfare, immigration
		Economic	Ownership, income, employment, women participation, workplace
		Organizational	Administrative affairs, capacity of shelters
8	(Norouzi et al., 2017)	Demographic characteristics	Population growth and density, vulnerable groups, the elderly, social preparedness
		Knowledge and awareness	Literacy and social cooperation

T 1. Factors and indicators of Social Resilience.

		Population density		Average of population density in the area, population growth
		Vulnerable population		Population density of the elderly and the disabled
		Social cooperation		Demographic characteristics, population density, knowledge and awareness, literacy
		Social preparedeness		Population density
		NGOs		Number of NGOs active in disasters
9	(Rousta et al., 2017)	Social capital	Public trust	Paying attention to advices, interfering in the lives of others, people abusing private professions, honesty and uniformity, the level of trust during the crisis to promote the region's resilience.
			Institutional trust	Sense of responsibility of the city towards its citizens, people's trust in the officials, necessary trainings by the institutions, satisfaction of the residents of the area.
			Informal participation	Participation in decision-making, believing in teamwork, consultation and participation in programs, regional affairs, believing in progress in light of participation
			Awareness	Participation in decision-making, awareness of crisis management, awareness of the performance of the city council, the population covered by risk reduction programs, accountability of service institutions in times of disasters.
		Place belonging		Sense of responsibility against individuals, friendly relationships, sense of sadness when leaving the place, inclination to live in the place, being proud to be a part of the place,
10	(Dalakeh et al., 2017)	Equity in education		Literacy and education
		Age		Percentage of the non-elderly, age average, population growth rate
		Access to transportation		Satisfaction with access to public transportation
		Connection capacity		Satisfaction with internet services
		Special needs		The percentage of disabled population
		Health coverage		Infirmary, urban health, urban health centers, satisfaction with urban facilities, hospitals
		Language proficiency		Language associations and cultural centers
		Social harms		Unemployment, crime, security
		Sociability		Positive social behavior
		Family support		Those in need of guardian
		Culture		Number of religious and historic centers
		Sense of belonging		Amount of immigration
11	(Kamandari et al., 2018)	Awareness		Households awareness, awareness from the house resilience, safety regulations, awareness from preparation and implementation of crisis management programs in the local level, awareness from the preparatory actions against disasters, awareness from the reactions and suitable behavior in times of crisis
		Knowledge		The status of knowledge in households, required educations for preparation against disasters, identification of vulnerable groups and people
		Skill		The status of the skill of households in facing earthquakes, participation in training courses, coping with natural disasters, identification of safe places in a house, temporary accommodation
		Attitude		Studying the attitude and belief of households, paying attention to the building resilience
		Social capital		Capability and effectiveness, trust and compassion, cooperation, friendship, trust in law

T 1. Factors and indicators of Social Resilience.

The results of the studies show that the protection of the urban environment in New York City is one of the most effective domains in community-based recovery programs and has affected the long-term sustainability of the city. Saja et al. have reviewed the frameworks used in studies on social inclusion since 2005. They have used a specific framework for measuring social inclusion, which includes the following 5 dimensions: social structure; social capital; social values and mechanisms/capabilities; equality and social diversity; beliefs and social culture (Saja et al., 2018). Chun et al. studied social resilience in flood-prone areas of the metropolitan area of Seoul, South Korea. In this study, social resilience has four domains: human, social, economic and organizational dimensions. The indicators of these four domains are examined (Table 1) and its relationship with flood risk has been determined using weighted regression analysis. The results of this study show that there is a significant relationship between the rate of social resilience and the rate of possible flood damage. Moreover, the indicators of population density, age, disability and ethnic inequalities have a positive and direct relationship with potential flood damage (Chun et al., 2016). Khalili et al., by studying the indicators of social resilience of communities against floods in the state of New South Wales, Australia, have provided a general framework and determined indicators for measuring the social resilience of communities in different phases of disasters (Khalili et al, 2015). Emphasizing the importance of social resilience and its effectiveness in the stages of preparedness, response and recovery after a disaster, Kwok et al. (2016) studied social resilience in Wellington, New Zealand and have provided a core of social resilience indicators to measure it. They have divided social resilience into two domains, structural and cognitive, each of which includes several

sub-domains. Nowruzi et al. (2017) have studied social resilience in District 12 of Tehran. In this study, after identifying and defining the operational indicators and factors affecting social resilience, using entropy methods and hierarchical analysis, the resilience of areas in District 12 of Tehran have been determined. The result of this study shows that demographic characteristics have the greatest impact on the resilience of neighborhoods in District 12 of Tehran. Among these neighborhoods and divisions, Division 5 is the most tolerant area in this area. Rousta et al. (2017) evaluated and analyzed the rate of social resilience in the five districts of Zahedan city and collected information in both documentary and field forms (questionnaire and interview). They have used the domains of social capital (public trust, institutional trust, formal participation, informal participation, and place awareness and belonging). The results obtained from this study show that the domains of social capital and place belonging are not the same for all five districts. Districts one, two and five have a more favorable situation than districts three and four of Zahedan city. Also, inappropriate mental atmosphere in urban areas of Zahedan has caused vulnerability and lack of social resilience in this city. Dalakeh et al. (2017) have measured the level of social resilience in urban areas of Isfahan. They have considered the social characteristics of the community and also the discussion of social capital for the 15 districts of Isfahan. In this study, it is concluded that the social resilience of District 3 is very high due to the desired number of religious-historical, health and medical centers, and satisfaction with access to public transportation, internet services and security. After that, districts 5 and 1 are in the next ranks, and districts 2 and 6 are the weakest regions in terms of social resilience compared to other regions. This is partly because of the rate of unemployment, crime and social misconduct in these districts. Kamandari et al. (2015) have studied the spatial analysis of social indicators of urban resilience in the four districts of Kerman city using the resilient city model as a solution to reduce urban vulnerability. The results obtained from this study show that the four districts of Kerman are in different situations in terms of social resilience. District 2 of this city have a more favorable situation than other districts. Districts 3, 1 and 4 are next, respectively. Also, the four districts of Kerman are not in a good condition in terms of social resilience. Quite shockingly, more than half of the districts of Kerman do not have the necessary resilience against natural disasters such as earthquakes. In this research, indicators of awareness, knowledge, skills, social capital and attitude have been studied.

These studies are summarized and mentioned in Table 1. From the summary of the above materials and with regard to the conditions of District 9 and the metropolis of Tehran, a conceptual model of the study is extracted and presented in Figure 1.

The conceptual model of the study shows that social resilience consists of 5 domains of social capital, social values, social structure, equality and social diversity, and social beliefs and culture. It has to be mentioned that all these domains are interrelated**.**

Research Methodology

Geographical scope of research

District 9 of Tehran is located in the southwest of Tehran with important infrastructures such as Mehrabad Airport and Azadi Square. It is bordered by District 5 from the north, District 10 from the east, District 21 from the west, District 18 from the south, District 22 from the northwest, District 2 from the northeast, and District 17 from the southeast. This area was composed of 8 neighborhoods before 2006, but since 2006, the number of neighborhoods has increased to 9.

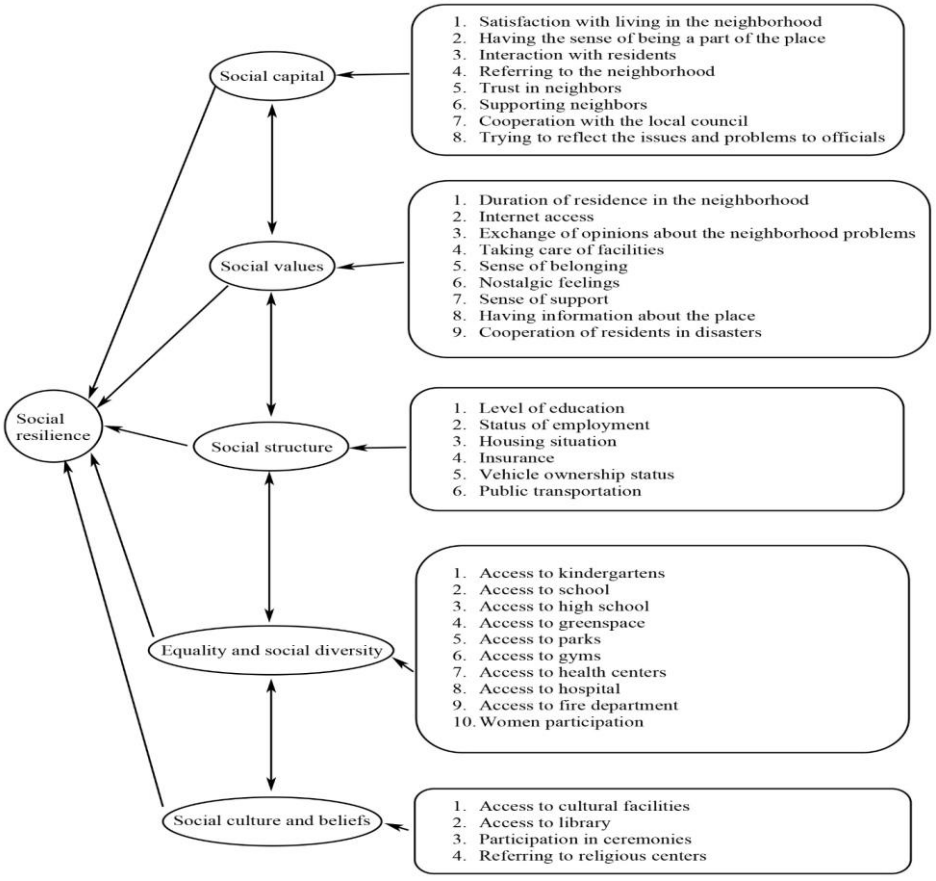
Factors and indicators of research

As can be seen from the conceptual model of the study (Figure 1), the assessment of the social resilience of District 9 needs analysis of five factors: social capital, social values, social structure, equality and social diversity, and social beliefs and culture (37 indicators in total).

Research method

The research method of this study is scientific-applied and its approach is descriptive-analytical. The required data were collected by completing a questionnaire, the

number of which was determined using the Cochran's formula with 95% confidence and an acceptable error of 10%. For the purposes of this study, 106 questionnaires were completed and collected using regular sampling method in the neighborhoods of District 9 of Tehran. Factor analysis method was used to analyze the questionnaires. SPSS and Excel software were used to analyze the data to show the degree of social resilience of the neighborhoods in District 9.



F 1. Conceptual model of research

Discussion and analysis of results

Exploratory factor analysis was used to categorize the 37 indicators into the five factors of social resilience. First, the adherence of indicators to the normal distribution was calculated and checked by measuring their elongation and skewness coefficients. Then, the numerical value of KMO was calculated, and Bartlett test was conducted for each of the five factors to measure the appropriateness of data which are presented in Table 2.

Numerical values of KMO and Bartlett test show that the data are suitable for factor analysis to determine the explanatory factors of these domains. For all five domains of social resilience, exploratory factor analysis has been performed and because there is a correlation between the five domains of social resilience in the conceptual model of the study, the Promax Rotation method has been used to extract the factors (Zebardast, 2017). In this article, as an example, only the extracted factors for the social capital domain are shown (Table 3).

Row	Domain	KMO	Bartlett Test	Extracted factors	Cumulative (%)
1	Social capital	0.585	0.000	3	65.52
2	Social values	0.712	0.000	3	59.93
3	Social structure	0.608	0.001	3	56.87
4	Equality and social diversity	0.708	0.000	3	65.27
5	Social culture and beliefs	0.574	0.000	2	77.93

T 2. KMO and Bartlett test for Social Resilience to examine data proportion for Factor Analysis.

Indicator	Factors		
	1	2	3
Having the sense of being a part of the place	.894		
Satisfaction with living in the neighborhood	.720		
Interaction with residents	.607		
Trust in neighbors		.941	
Supporting neighbors		.926	
Cooperation with the local council			.840
Referring to the neighborhood			.656
Trying to reflect the issues and problems to officials			.636

T 3. Determining factors in Social Capital domain and its indicators – Structure Matrix.

According to the indicators of each domain (Table 3), factors were named as follows:

The first factor: It is mostly relevant to the indicators of the sense of belonging to the community, happiness of living in the neighborhood and socializing with other members of the neighborhood. The name of this factor is Social Cohesion.

The second factor: It is mostly relevant to indicators of the level of trust in each other and the support of neighbors to each other. This factor is named as Social Support.

The third factor: It is mostly associated with indicators of cooperation with the neighborhood council, going to the neighborhood hall and trying to bring issues and problems to the attention of the authorities. This last factor is called Social Participation.

In the same way, using exploratory factor analysis method and Promax Rotation method, other explanatory factors of 4 other domains of social resilience for the neighborhoods of District 9 were extracted and listed in Table 4.

Row	Domain	Extracted factors
1	Social capital	Social cohesion
		Social support
		Social participation
2	Social values	Sense of belonging to place
		Social awareness
		Social ability
3	Social structure	Social ability and dynamism
		Demographic structure
		Level of literacy
4	Equality and social diversity	Access to safe place in times of crisis
		Access to basic services
		Access to education services
5	Social culture and beliefs	Social beliefs
		Social culture

T 4. Extracted factors of 5 domains of social resilience.

Equation (1) was used to combine the explanatory factors of the social capital domains and to achieve the integrated factor score of this domain (Zabrdast and Habibi, 2009: 121).

Equation (1) $$SC_i = \frac{\sum_{i=1}^{n} \lambda_i FS_i}{\sum_{i=1}^{n} \lambda_i}$$

SC_i = Factor rating of social capital domain

λ_i = Percentage of changes explained by factor i.

FS_i = Operating score i

n = Number of factors explaining the social capital domain

Thus, using Equation (1), the score of other domains of social resilience was calculated for the neighborhoods of District 9 of Tehran. The score of the five domains of social resilience was converted from 0 to 1 using Equation (2) (Zabrdast, 1396: 15).

Equation (2) $$FS_i = \frac{X_i - X_{min}}{X_{max} - X_{min}}$$

FS_i = Operating score conversated for domain i

X_i = Operating score for domain i

X_{min} = Minimum operating score for domain i

X_{max} = Maximum operating score for domain i

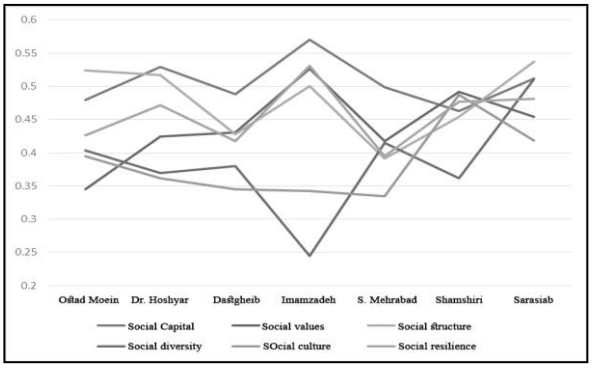
The result of the converted factor score for the five domains of social resilience is presented in Table 5 and Figure 2.

The data of Table 5 and Figure 2 show that the social capital of neighborhoods (Moein, Dastgheib and Shamshiri) are not in a very favorable situation, and it is in a moderate situation for other neighborhoods (Dr. Hoshyar, Imamzadeh Abdullah, South Mehrabad and Sarasiab). In the domain of social value, except for Imamzadeh Abdullah neighborhood (with an average of 0.52), the situation is not very favorable for the rest of the neighborhoods. In terms of social structure, except for the neighborhoods of

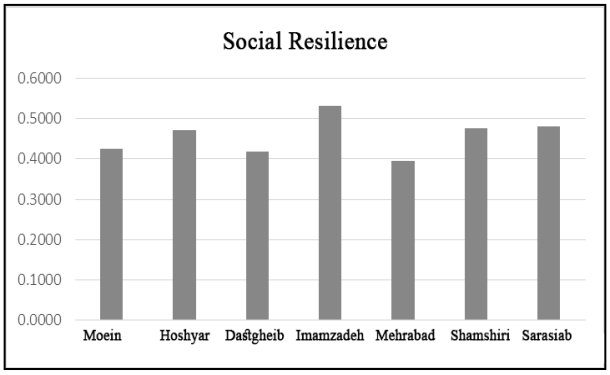
Ostad Moein, Dr. Hoshyar and Imamzadeh Abdullah, which have average scores, the rest of the neighborhoods (Shahid Dastgheib, Shamshiri, South Mehrabad and Sarasiab) suffer from unfavorable conditions. In terms of equality and social diversity, with the exception of Sarasiab neighborhood of Mehrabad, the rest of the neighborhoods (Moein, Dr. Hoshyar, Shahid Dastgheib, Imamzadeh Abdullah, South Mehrabad and Shamshiri) with averages less than 0.5 are not in a favorable situation. In terms of beliefs and social culture, all neighborhoods are in an unfavorable situation because the average of all neighborhoods is less than 0.5. In terms of social resilience of the neighborhoods, which is obtained from the sum of the points of all five domains, except for Imamzadeh Abdullah neighborhood (with an average of 0.53), the rest of the neighborhoods are in an unfavorable situation because the average of all of them is less than 0.5. Therefore, in general, the social resilience of District 9, which consists of the sum of the privileges of all its neighborhoods, is not in a very favorable situation (Figure 3).

Neighborhood	Social capital	Social values	Social structure	Equality and social diversity	Social culture and beliefs	Social resilience
Ostad Moein	0.4794	0.3450	0.5237	0.4038	0.3949	0.4260
Dr. Hoshyar	0.5295	0.4249	0.5172	0.3697	0.3618	0.4713
Shahid Dastgheib	0.4878	0.4308	0.4278	0.3804	0.3453	0.4179
Imamzadeh Abdullah	0.5704	0.5267	0.5001	0.2444	0.3425	0.5313
S. Mehrabad	0.4987	0.4171	0.3911	0.4147	0.3349	0.3951
Shamshiri	0.4626	0.4914	0.4541	0.3613	0.4871	0.4766
Sarasiab	0.5117	0.4541	0.5372	0.5105	0.4183	0.4809
District 9 (overall average)	**0.5057**	**0.4414**	**0.4788**	**0.3835**	**0.3835**	**0.4570**

T 5. Domains of Social Resilience in Neighborhoods of District 9.



F 2. Scores of 5 domains of social resilience in the neighborhoods of District 9.



F 3. Social resilience of neighborhoods of District 9.

One-way ANOVA test was used to examine whether there is a significant difference between the neighborhoods of District 9 in terms of social equity. The results are shown in Table 6.

The result of ANOVA test shows that there is no significant statistical difference between the social literacy of the neighborhoods of District 9 (sig = 0.655). Therefore, although the numerical values of the social resilience in the neighborhoods of District 9 are different from each other, it is not statistically significant. In other words, the neighborhoods of District 9 of Tehran have similar social resilience.

Conclusion

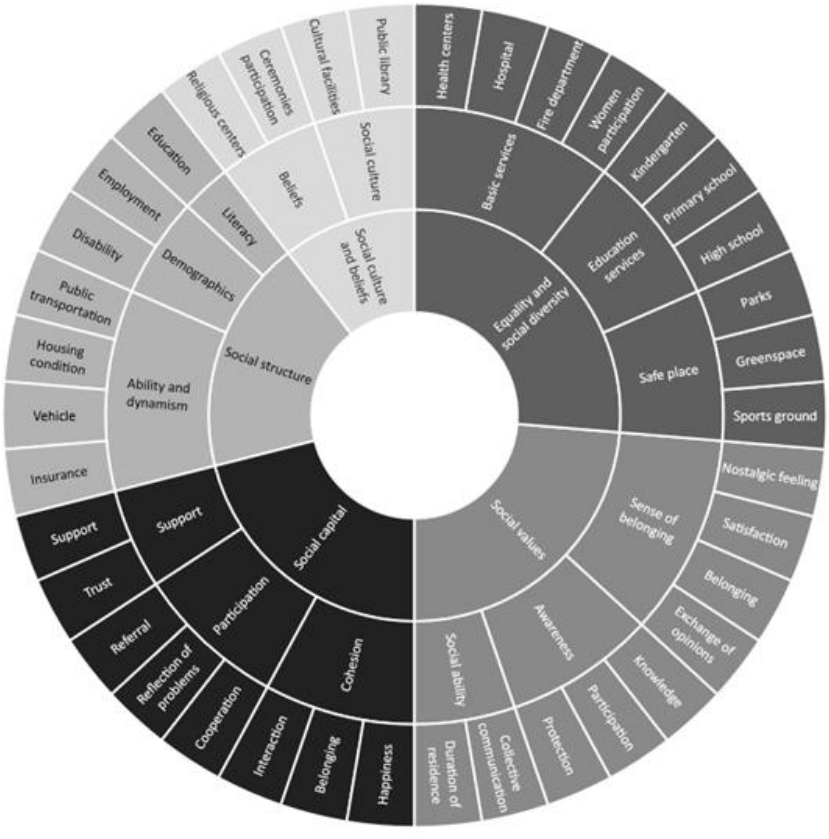
The aim of this article was to identify the indicators and domains explaining social resilience in District 9 of Tehran, to investigate its spatial distribution between the divisions of District 9, and to answer whether there is a significant difference between the divisions of District 9 in terms of social resilience or not.

Descriptive						
Social Resilience						
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
1	11	-.1164646	.71380894	.21522149	-.5960080	.3630788
2	22	.0380105	.56978630	.12147885	-.2146186	.2906396
3	14	-.1438879	.82649763	.22089078	-.6210934	.3333176
4	15	.2428285	.81802086	.21121208	-.2101763	.6958334
5	14	-.2216028	.83741317	.22380808	-.7051108	.2619052
6	14	.0561237	.64091029	.17129048	-.3139269	.4261743
7	16	.0708485	.67942569	.16985642	-.2911919	.4328889
Total	106	-.0000001	.71520489	.06946684	-.1377400	.1377398

ANOVA					
Social Resilience					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.167	6	.361	.694	.655
Within Groups	51.542	99	.521		
Total	53.709	105			

T 6. One-way ANOVA Test Results for Social Resilience in District 9.

The results obtained from this study show that social resilience consists of 5 domains: Social Capital (including factors of social cohesion, social support and social participation); Social Values (including factors of sense of belonging to place, social awareness, and social ability); Social Structure (including factors of social ability and dynamism, demographic structure, level of literacy); Social Beliefs and Culture (including factors of social beliefs and social culture); and Equality and Social Diversity (including factors of access to safe place in times of crisis, access to basic services, and access to education services). The relationship between the indicators, factors and the five domains of social resilience is shown in Figure 3.



F 3. Indicators, domains and factors of social resilience in District 9.

The neighborhoods of District 9 of Tehran metropolis are in an unfavorable situation in terms of social literacy. Moreover, although there are differences between the level of social literacy of the 7 neighborhoods of District 9 of Tehran metropolis, these differences are not statistically significant.

The overall rate of social resilience in District 9 is very weak. To improve it, we need to pay attention to all the domains of social resilience. The two domains of equality and social diversity and social culture and beliefs have the lowest score among the five domains of social resilience in District 9. A look at the indicators and factors of these domains indicates that the residents of this area are very dissatisfied with their access to parks and gardens, greenspaces, sports grounds, healthcare centers, hospitals, fire departments, kindergartens, high schools, public libraries and cultural facilities. To improve the social resilience of this area, the first priority is to address these shortcomings. Planning to address employment, access to public transportation, and housing issues should be the next priority in order to increase the region's social resilience.

Endnotes

1. In Promax rotation, factors are extracted in a paired way.

References

- Jayka (2000), "Final Report of Tehran Seismic Zoning Project", Tehran Earthquake and Environmental Studies Center and Japan International Cooperation Agency.
- Dalakeh, Hassan, Shahivandi, Ahmad, Mohsen Beigi, Samareh, Hossein, (2017), "Measuring the rate of social resilience in urban areas of Isfahan", Sociology of Social Institutions, Volume 4, Number 9, P. 227 - 252.
- Rousta, Mojtaba; Ebrahimzadeh, Isa; Istgoldi, Mustafa. (2018), Evaluating the rate of urban social resilience in Zahedan. Urban Research and Planning, Volume 2, Number 39, P. 1-14.
- Zbardast, Esfandiar; Habibi, Mitra. (2009), The study of scattered phenomenon and its causes in Zanjan. Journal of Fine Arts, Architecture and Urban Planning, Volume 1, Number 38, P. 115 - 123.
- Zbardast, Esfandiar. (2017), "Application of Exploratory Factor Analysis (EFA) in Urban and Regional Planning", Journal of Fine Arts, Architecture and Urban Planning, Volume 22, Number 2, P. 5-18.

Kamandari, Mohsen, Ajzashokouhi, Mohammad, Rahim Rahnama, Mohammad, (1397), "Spatial analysis of social indicators of urban resilience in the regions of Kerman", Urban Social Geography, Volume 5, Number 2, P. 85-69.

- Nowruzi, Akram, Sarvar, Rahim, Hajiloui, Mahdavi, Massoud, (2017), "Assessment of effective social domains in the resilience of the 12th district of Tehran", Geographical Research Quarterly, Year 32, Issue 4, Winter 2017, Consecutive Issue 127, P. 86 -103.
- Aslani, Fereshteh and Amini Hosseini, Kambod (2018), "Identity and Collective Memory on Social Resilience at Neighborhood Level using Grounded Theory", Space and Culter, Articles in Press.

Chun, H; Chi, S: and BG Hwang (2017) A spatial disaster assessment model of social resilience based on geographically weighted regression, Sustainability, Vol. 9, 2222, pp. 1-16.

- Khalili, Sanaz; Michael Harre and Morely, Philip (2015), "A temporal framework of social resilience indicators of communities to flood, case studies: Wagga wagga and Kempsey, NSW, Australia", Journal of Disaster Risk Reduction, Vol. 13, pp. 248-254.
- Kwok, AH ; Doyle, EEH; Becker, J; and Johnston, D. (2016), "What is 'social resilience'? Perspectives of disaster researchers, emergency management practitioners, and policymakers in New Zealand", International Journal of Disaster Risk Reduction, vol. 19, pp. 197-211.
- McMillen , Heather; Lindsay K. Campbell, Erika S. Svendsen and Renae Reynolds (2016), " Recognizing Stewardship Practices as Indicators of Social Resilience: In Living Memorials and in a Community Garden", Sustainability, Vol. 8, pp. 2-26.
- Saja, A.M. Aslam; Ashantha Goonetilleke, Melissa Teo and Abdul M. Ziyath (2019), "A critical review of social resilience assessment frameworks in disaster management", Journal of Disaster Risk Reduction, Vol. 35, pp. 1-14.
- Saja, A.M. Aslam; Melissa Teo; Ashantha Goonetilleke and Abdul M. Ziyath (2018), "An inclusive and adaptive framework for measuring social resilience to disasters', International Journal of Disaster Risk Reduction, Vol. 28, pp. 862-873.