ISSN 1846-6168 (Print), ISSN 1848-5588 (Online)
https://doi.org/10.31803/tg-20220529092148

Preliminary communication
Received: 2022-05-29, Accepted: 2022-05-31

Analysis of Economic-Physical Resilience of Cities: Islamshahr City, Iran

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Abstract: Resilience is a new approach to assessing and enhancing the resilience and resilience of the foundations of development in cities. Explaining and recognizing its effective and promotional components can pave the way for many programs related to crisis management and passive urban defense, which is very necessary given the complexities of today's threats. Different dimensions of human society resilience are examined in the physical, social, economic, environmental-institutional fields. In fact, resilience as a framework goes back to a concept that can easily relate to all stages and sections of disaster and crisis management. In this regard, the present study has been compiled with the aim of evaluating the dimensions of economic-physical resilience of cities around the metropolis of Tehran in the Islamshahr region. In this study, first through library studies, indicators and factors affecting economic and institutional resilience were identified and operational defined, then using a questionnaire in the form of hierarchical analysis process, the final weight of indicators by domestic experts and External was determined. Descriptive and inferential statistics (one-sample t-test and Friedman test) were used to analyze the data. Institutional resilience with an average of 2.5325, infrastructure resilience with an average of 2.4377 and urban resilience with an average of 2.3786 is therefore urban resilience and components of urban resilience in Islamshahr city are at a low level.

Keywords: economic resilience; institutional resilience; Islamshahr; metropolis

1 INTRODUCTION

Today, cities as the most dynamic residential areas are facing development and its dimensions and components [1]. Despite the acceleration of innovation and efforts for development and excellence, these places face numerous infrastructural and structural damages and challenges. These damages can cause threats and crises to cities in various ways in the process of urban development [2]. The mentioned damages in both human and natural parts can cause a crisis in the ability to live in cities and disrupt the living conditions in these places. On the other hand, the disasters that have occurred in recent years in cities and the complexity of its dimensions and aspects indicate an increase in vulnerability and dangers posed by these threats in cities [3]. Therefore, in this regard, having new and confronting attitudes towards threats and presenting strategic measures is essential. What is presented today as an inclusive and planned concept for cities and urban structures to be exposed to human and natural threats is the concept of resilience [4]. In the first understanding of the concept of resilience, it can be introduced as a process in the face of disorders, surprises and changes [5]. Researchers believe that there are two types of strategies in cities today to deal with the threats and damage caused by them. Predictive strategies and strategies related to resilience [6].

The concept of resilience was first proposed by Halling in 1319 in the field of ecology. According to Halling, resilience is defined as the way to understand the dynamic and nonlinear pressures absorbed in the ecosystem and the amount of perturbation that the ecosystem can absorb and maintain without major structural changes. Has been. With the introduction of resilience into urban planning and crisis management as a cultural birth, some refer to it as a new model in urban development [1]. Since 2010, the movement of resilient cities. Globalization has begun to take effective steps to improve the resilience of cities, and currently 2,500 cities are members of this movement. The last principles considered in the urban movement are resilience, organization and integration of urban management, and government attention to urban resilience, risk assessment and risk identification, and the use of financial capacity and sustainable income to increase urban resilience [5].

The main issue in urban resilience is prevention. Urban resilience management in each city requires its own definition, which is based on a deep understanding of the inherent and natural features of the city. In this definition, it is also necessary to know the biological features in different urban areas and neighborhoods separately, which based on each of the types of urban context, specific policies of urban management in the field of financing are explained and specified [5]. Resilience makes sense in the face of crisis, both in metropolitan and small cities. When talking about crises in cities, the general public refers to natural disasters such as floods, hurricanes, earthquakes or fires; But it should be noted that the main problem of Iran's metropolises is not only natural crises; It is also a crisis of human origin that can lead to a natural crisis, such as air pollution or climate change, which, with its human roots, is considered an environmental crisis. Resilient cities are ready to respond quickly in unexpected situations and continue to operate despite difficult conditions. The city of resilience in the long run requires the ability to return to its pre-crisis state and the ability to make subtle and flexible changes over time and the development of the city [7]. In general, a city is resilient, durable, adaptable, stable and strong. All of these characteristics must be seen in four dimensions: social, economic, institutional, and physical.

The social dimension shows the difference in social capacity between societies. In fact, the capacity of social groups and communities to recover after a crisis or respond positively to disasters, and indicators such as social capital, awareness, knowledge, Includes skills and attitudes. In the economic dimension, resilience is defined as the inherent response and adaptation of individuals and communities to risks that enable them to mitigate the potential harms of risks.

In economic activities, resilience addresses the need for the economic system to support the system to maintain stability and balance after accidents and crises, and its indicators are the capacity to compensate, the ability to return to working conditions and a decent income and intensity. Damages. The institutional dimension contains features related to risk reduction, planning and experience of previous accidents. Here, resilience is influenced by the capacity of communities to reduce risk, the employment of local people in reducing risk to establish organizational links, and the improvement and protection of social systems in a community. Institutional dimension indicators are context, relationships and performance. The physical dimension of the environment includes infrastructure facilities, superstructures, and environmental features, and assesses community response and post-crisis recovery capacity. In the physical dimension, in addition to the existence of suitable conditions for after the crisis, principles for the design of the body and the environment before the crisis are discussed. Indicators of environmental physical dimension are the condition of green and open spaces, land use suitability, land (bed), building resistance, accessibility and density [8].

In line with the importance of resilience in urban issues and with the approach of different systems, limited experimental studies have been conducted inside and outside Iran, including: [9] in a study entitled How survivors of the 2011 earthquake in Van, Turkey Understood social? Qualitative research method showed that resilience as providing fair distribution of timely services and good governance, financial resources, also contributes to awareness, preparedness and social solidarity before the earthquake. In [10] showed that the most important factor in promoting capital economic resilience, putting on individual industries in the region. In [11], through a semi-structured interview showed that the role of indigenous institutions after disasters It can be a lever to help create more resilient communities. In [12] in a study entitled Institutional Response to Development Pressures: Resilience of Social Systems and Ecology in Himachal Pradesh, India, using a semi-structured interview research method, showed areas where capacity building for resilience Ecological social is needed, helps to create sustainable development. In [13] showed that there is a significant relationship between resilience variables (social sense, self-efficacy, coping style, and social support) and psychological vulnerability. There was also no significant relationship between the dimensions of resilience and social sense.

In [14] by using comparative descriptive-analytical research method showed that among the different dimensions of resilience, Qazvin urban complex in terms of institutional dimensions and then The physical dimensions are more unfavorable. In [16] they have the most importance and institutional performance index and return ability index in terms of importance in average conditions and institutional context indicators and institutional relations are less important. In [17] explaining and evaluating the components of institutional resilience and Social in spontaneous settlements; Naysar Urban Detached Area; The results of the study indicate very low degrees of institutional and social resilience of this settlement compared to the optimal level of these criteria. In [18] assessing the resilience of Tehran metropolitan area 12 against natural hazards showed that the environmental sustainability component (20.33) related to the ecological dimension of urban resilience is in the first place and the system adaptability component (10.11) related to the institutional (organizational) dimension has been identified as the least important component. Also, the situation of the economic dimension of urban resilience in the face of natural hazards of quantitative (poor) desirability, the situation of social, ecological and institutional (organizational) dimensions is associated with very poor desirability. Finally, it can be stated that the desirability of urban resilience in the 12th metropolitan area of Tehran against natural hazards has been very weak with respect to all dimensions and components and therefore this area is not resilient and sustainable against natural hazards. The study of [19] showed that among the components of resilience, infrastructure resilience has more priority than other components and that all economic, social, infrastructural, physical and managerial components have a positive effect on the realization of urban resilience and are meaningful. In [19] explaining the relationship between formal form and disaster resilience in Tehran metropolitan areas indicates that different components of formal form have different effects on different resilience factors and in some cases, have had opposite behavior on the components of resilience. Among the dimensions of resilience, community resilience does not take any effect from the components of urban form. The highest correlation is observed between the density component and infrastructure resilience. The social dimension and total resilience had the most to do with the component access component. In general, the direct relationship between the components of access to public transportation and access to parts and the inverse relationship of the components of access to commercial centers and the amount of open and green space with resilience and its dimensions, shows the effect of form components on increasing or decreasing disaster resilience.

Finally, it can be said that the city of Tehran, due to its influential political and economic situation in the country, has special conditions in terms of crisis management in terms of the impact of natural disasters and the organizational and legal structure to deal with them. Accordingly, in recent decades, the risk of major cities in Iran, especially Tehran, against accidents and accidents has increased. Accordingly, this study examines the relationship between urban resilience and the risk of natural disasters such as floods and earthquakes, identifies the indicators and factors affecting economic and institutional resilience. Measures the degree of economic and institutional resilience in the studied neighborhoods.

2 THEORETICAL FOUNDATIONS

In the dictionary, urban resilience means elasticity, reversibility and resilience. Resilience has its roots in physics and means jumping backwards. In fact, resilient people are able to jump back. They have the ability to survive and even

overcome adversity. Resilience can help a person overcome adversity successfully and improve his or her social, educational, and professional competence despite being exposed to intense stress. Resilience is a trait that varies from person to person and can grow or decrease over time. Resilience means the ability to cope with difficult situations and to respond flexibly to the pressures of daily life. Resilience does not limit stress, it does not clear the problems of life, but it gives people the power to face the problems ahead, overcome difficulties and move with the flow of life. Some people have this trait naturally, but the point is that this trait is not exclusive to a few, and experts say that other people are able to learn and improve resilience; thus, resilience is the ability or consequence of successful adaptation to stressful and challenging situations [8]. Since resilience encompasses all sectors and urban considerations, the dimensions defined for it are also considered in all social, economic, physical, and planning dimensions, which are briefly addressed to each one of them is paid.

2.1 Economic Resilience

Resilience in economics is the inherent response and adaptation of individuals and societies to risks; to enable them to reduce potential damages and losses. Due to the wide interconnectedness at the macroeconomic level, economic resilience depends not only on the job capacity of individuals but also on the capacity of all institutions [17].

Economic resilience is also defined as the ability of a society to adapt socially and economically to natural hazards. This resilience has two components: the capacity of society to return to pre-accident economic conditions and the second is the capacity of societies to reduce the risk of future accidents and hazards, both in response to the disaster that society has experienced and before [6]. Therefore, economic resilience to the extent and extent of the damage, the capacity or ability to compensate for the damage and the ability to return to suitable employment and income, the amount of household capital and income convertible into capital and employment, housing status, access to financial services, Insurance, low costs, and the ability to resume household economic activity after an accident are assessed. This increases or decreases economic stability, especially livelihood stability at the community level.

2.2 Social Resilience

The second indicator of resilience is the social dimension, which is obtained from the difference in social capacity between societies. This dimension has economic, political, judicial, institutional and social dimensions at its heart. A resilient community is able to respond positively to change or stress. It can also maintain its core functions as a whole despite the tensions that exist. The social resilience approach is a way of understanding the dynamic systems that relate to the interactions between people and the environment. Social resilience is a useful perspective for understanding management decisions and changes related to natural resources. In particular, social resilience is known for having three characteristics that include the ways in which people respond to unforeseen events. These three aspects are: resilience, recovery and social creativity that has a high resilience that has the capacity to display all three characteristics mentioned above. The concept of social resilience itself has the same concerns as the concept of resilience and is also particularly complex due to differences in the definition of society. For example, a community is an entity that shares geographical boundaries and a common destiny. Communities are made up of built-in natural, social, and economic environments that interact in complex ways. Just as resilience can be analyzed and understood at different levels, social resilience also has levels [9].

2.3 Institutional Resilience

Institutional resilience is defined as the capacity of communities to reduce risk and create organizational bonds within society; in a way that includes features related to risk reduction, planning and experience of previous accidents [12]. In this dimension, the physical characteristics of organizations such as the number of local institutions, access to information, trained and volunteer personnel and personnel, adherence to crisis management guidelines, the timeliness of rules and regulations, deterrent and incentive rules and regulations to Especially in the construction of housing, the interaction of local institutions with the people and government institutions, satisfaction with the performance of institutions, accountability of institutions and how to manage or respond to disasters such as organizational structure, are evaluated [18].

2.4 Environmental Physical Resilience (Infrastructure)

The physical-environmental dimension (infrastructure) basically includes assessing the community response and post-disaster recovery capacity such as shelters, vacant or rented housing units, and health facilities. These indicators also provide an overview of the amount of private property that may be particularly vulnerable to permanent damage and potential economic losses. One of the most important vulnerable infrastructures is low-durability houses that are sensitive to a catastrophic accident [16]. Provide comparisons between and within each area for communities. It is necessary to explain that there is no consensus on the explanatory indicators of resilience, and each study has addressed separate indicators based on its approach [15].

3 MATERIALS

3.1 Location of the Study Area

Islamshahr city is one of the cities of Tehran province. The center of this city is Islamshahr. The city is bounded on the east and south by Rey, on the west by Baharestan, and on the northwest by Shahriar (Fig. 1). In 2016, the city had a population of 548,620, of which 279,282 were men and 269,338 were women.

The area of the city is about 245 square kilometers, which in terms of geographical coordinates with a slight

difference from the center of Tehran in 51 degrees and 10 minutes north longitude to 30,22,51 and latitude 30,42,34 to 30,27,35 east latitude of the meridian Greenwich is located in 2 districts, 4 villages and 49 villages, with a minimum distance of up to km and a maximum of 10 km. This city is located in the alluvial plain area south of Tehran and its height above sea level is about 1150 meters. Islamshahr consists of 6 districts, of which 1 and 2 are central and 3 are Vavan town, 4 are Shatereh, 5 are parts of Ahmadabad Mostofi (outside Ahmadabad Mostofi district), 6 are between Miyanabad and Imam Khomeini town.

There is no significant elevation in the city, but as mentioned, the city lands are located on the alluvium of the southern slopes of "Tochal" and "Kan" heights and with a very gentle natural slope from north to south from its height slightly It is reduced and the difference in height between the highest and lowest points is a maximum of 10 meters, so due to the gentle slope and flatness of the city lands away from the impact of industrial pollution will not cause the phenomenon of "inversion" or "temperature inversion" and rain. Will be acidic, which will have deadly effects on the environment and the climate of the city.

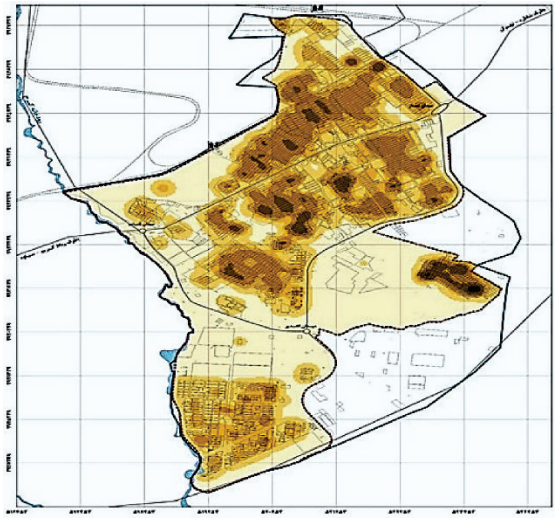

Figure 1 Location of the study area

3.2 Research Methods

Therefore, due to the nascent concept of resilience, no specific methodology or standard framework for assessing resilience against natural disasters is available. Therefore, according to this model, first, physical and infrastructural assets and wealth in Islamshahr city are calculated and a profile of the current situation is drawn. These assets include aspects such as sensitive infrastructure (telecommunications, energy, health, Transportation and water, land use, public spaces, etc.) This component is mainly related to assessing the community response and post-disaster recovery capacity and the overall assessment of the amount of private property that may be subject to permanent damage and loss. Provides potential economic opportunities that are particularly vulnerable. The present study is an applied-developmental research and its study method is descriptive-analytical which deals with a deep understanding of the causes and factors and analysis, quality and value of phenomena related to the human environment and human behaviors. Part of the statistics and theoretical information of the present study was collected as a library using internal and external sources (books, articles, dissertations, organizational documents) and the other part was collected through field and survey methods. Local observations and interviews with people and officials were conducted and by combining and using thematic studies and the results of official censuses and verifying existing maps, photographs and aerial and satellite images to analyze and infer from studies and references. Government institutions and related organizations such as the municipality, the Housing and Urban Development Organization and other relevant departments to obtain statistics, maps, documents, organizational documents and plans that are related to the organizations in question.

3.3 Statistical Method

This research is a type of cognitive research (geographical studies) which has been done analytically-descriptively. The statistical population of the study is experts in urban planning issues, from which 384 people were selected as a sample and questioned. All research data (urban resilience) have been collected in the form of libraries and fields. The library part of the available resources was done and the survey work included the completion of a questionnaire.

The researcher-made questionnaire was in the form of a Likert scale on a ranking scale (very high, high, relatively high, to some extent, relatively low, low and very low) and its completion was done by field studies. The variables of this study included 5 dimensions of resilience (economic, social, institutional, infrastructure and urban) along with its components. The components considered in this study were selected based on studies conducted inside and outside Iran and its validity (validity) according to the importance of each to the study area, by 10 experts in planning management issues. Urban was reviewed and approved. Cronbach's alpha coefficient was used to determine the reliability of resilience dimensions. The calculated coefficient is equal to 0.83; This value indicates the high reliability of the questions. Statistical analyzes such as frequency, percentages, maximum and minimum, mean and standard deviation have been used to analyze the data in the descriptive part. In the inferential section, one-sample t-test and Friedman test were used with the help of required statistical analysis.

4 RESULTS

4.1 Risk Analysis

The most important natural threat to Tehran province is earthquakes, which Islamshahr city also faces. In this regard, the last condition of the faults is 1, 1, 1, and 3 of the currents.

After that, landslides and subsidence are the most important threat in this province, which is becoming a potential threat in the area due to the load of the city and the amount of water withdrawn from the aquifers of the area. These threats are shown in Fig. 2.

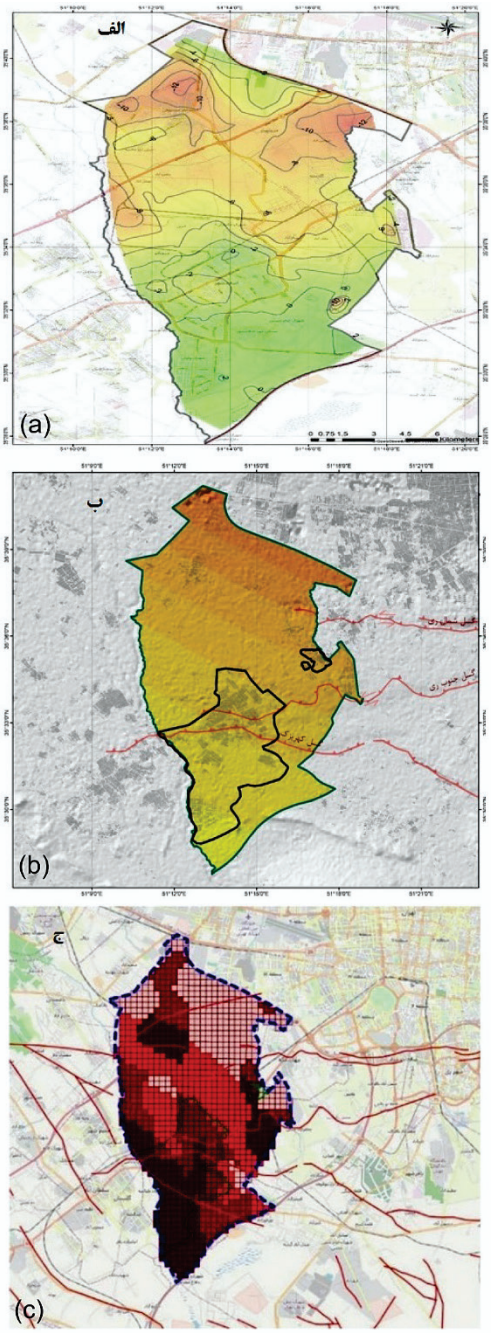

Figure 2 Subsidence status (a), existing active faults (b) and risk of faults (c) in Islamshahr city

According to the fault and subsidence conditions in the study area, the vulnerability of water and electricity network, sewage and surface water, transportation network and current status uses with the risks of these indicators and adaptation and hazard map produced in the city. These studies show that most of the urban areas in areas 2 and 1 are located between two active faults. In this area, a large number of residential uses, several service departments, the governor's office, two municipal areas, four fuel stations, The main hospital of the city, the three main drinking water reservoirs and the areas where the city is being developed in the current development.

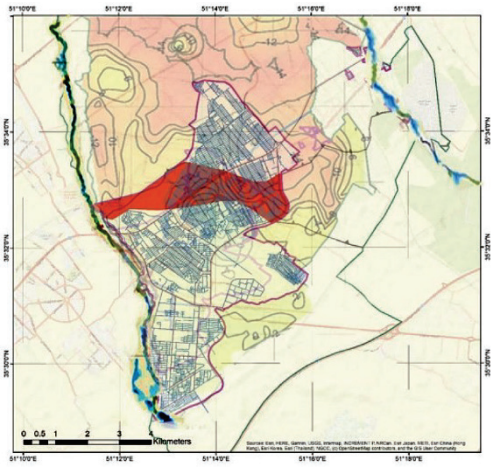

Figure 3 Adaptation of fault layers, subsidence and flooding in Islamshahr city

4.2 Descriptive Findings

In the first part, descriptive findings of the research and in the second part, inferential findings are presented and discussed. The sample statistical population for the distribution of the questionnaire based on Cronbach's alpha formula is 384 people. In terms of assessing the validity of the questionnaire.

Economic resilience:

In order to study the level of economic literacy in Islamshahr city from the perspective of residents, 9 items in the field of economic literacy in Islamshahr city were designed and the audience was asked to answer based on 5 Likert scales. Economic From the perspective of residents of Islamshahr city, the coefficient of variation index was used. In Tab. 1 the items of economic resilience are prioritized from the perspective of the respondents.

4.2.1 Institutional Resilience

In order to study the level of institutional literacy in Islamshahr city from the perspective of residents, 13 items were designed in the field of institutional literacy in Islamshahr city and the audience was asked to express their answers about the level of institutional literacy in Islamshahr city in a Likert scale (Tab. 2). In order to prioritize the items of institutional resilience from the perspective of Islamshahr residents, the coefficient of variation index was used.

4.2.2 Infrastructure Resilience

To examine the rate of infrastructure resilience in Islamshahr city from the perspective of residents, 16 items were designed in the field of infrastructure resilience in Islamshahr city and the audience was asked to give their answers about the rate of infrastructure resilience in Islamshahr city in a range of 5 Likert options. To express (Tab. 3) Tab. 9 shows the frequency and percentage of responses of all subjects for each item. In order to prioritize the items of infrastructure resilience from the perspective of Islamshahr residents, we use the coefficient of variation index. The results of infrastructure resilience items are prioritized from the respondents' point of view.

Table 1 Frequency distribution of respondents according to the response to economic resilience items

Items	Very Low	Low	Medium	High	Very High	Mean	SD	Dispersion coefficient	Priority
Job vulnerability and loss in the event of an earthquake	22/1	34/9	33/1	7/8	2/1	2/3281	0/9730	0/4179	1
The level of safety of property in Islamshahr neighborhood (shops, houses) against earthquakes 3	23/7	22/1	36/2	14/1	3/9	2/5234	1/1145	0/4416	2
The level of support of government and local institutions to compensate for financial losses	28/9	28/4	26/6	12/0	4/2	2/3411	1/1383	0/4862	6
Status of ability to return to working conditions and adequate income of residents after the earthquake	29/1	24/0	25/8	13/3	7/8	2/4661	1/2532	0/5081	8
Probable time to get a new job in case of losing the first job due to the earthquake	23/7	29/9	28/1	10/7	7/6	2/4844	1/1806	0/4752	4
Hope for insurance and other compensatory support to revitalize the living environment	33/3	31/8	20/3	9/6	4/9	2/2109	1/1515	0/5208	9
The amount of household savings to revive their lives	32/3	23/2	29/2	12/2	3/1	2/3073	1/1377	0/4930	7
The level of job and professional skills of the residents	25/5	24/2	32/8	14/8	2/6	2/4479	1/1018	0/4501	3
The household's ability to relocate to new housing and environments outside the crisis zone	28/1	32/0	27/6	7/3	4/9	2/2891	1/1017	0/4812	5

Table 2 Frequency distribution of respondents in terms of response to institutional resilience items

Items	Very Low	Low	Medium	High	Very High	Mean	Standard Deviation	Dispersion coefficient	Priority
The amount of information provided by the relevant agencies about the crisis and post-crisis conditions	21/9	27/9	24/7	20/3	5/2	2/5911	1/1838	0/4568	3
Residents' confidence in urban management measures	26/6	24/5	26/0	16/7	6/2	2/5156	1/2219	0/4857	8
Residents' awareness of the existence of organizations related to crisis management or natural disasters	16/9	22/9	20/6	24/2	15/4	2/9818	1/3293	0/4458	2
Opinion and awareness of residents about the tools and equipment of crisis management organizations	26/8	20/8	29/7	14/1	8/6	2/5677	1/2581	0/4899	9
Extent of volunteer and relief groups	23/4	21/6	32/0	13/8	9/1	2/6354	1/2358	0/4689	4
The degree of adherence to legal guidelines for accident prevention	27/6	21/1	30/7	14/6	6/0	2/5026	1/2070	0/4822	7
Residents' participation in decision-making and planning	33/9	31/0	22/9	8/1	4/2	2/1771	1/1124	0/5109	11
Residents' relationship with institutions such as the municipality, the Red Crescent Society and crisis management	22/9	18/0	27/9	18/8	12/5	2/7995	1/3221	0/4722	6
The level of cooperation of the municipality in facilitating laws, giving credits, loans, etc. for the construction of housing that is resistant to the people	38/8	21/6	23/7	10/7	5/2	2/2188	1/2152	0/5476	13
Preparedness of service institutions such as fire department, hospital, clinic, electricity, water, gas in case of earthquake	18/5	19/0	24/7	26/6	11/2	2/9297	1/2816	0/4374	1
Extent of classes or training courses required for crisis response (earthquake) by institutions	29/2	30/7	23/7	11/5	4/9	2/3229	1/1539	0/4967	10
Extent of general training to residents to prepare before, during and after the crisis	35/7	27/3	22/4	8/6	6/0	2/2188	1/1913	0/5369	12
The degree of participation of social institutions in resolving urban affairs	25/3	27/1	29/2	13/3	5/2	2/4609	1/1555	0/4695	5

Table 3 Frequency distribution of respondents by response to infrastructure resilience items

Items	Very Low	Low	Medium	High	Very High	Mean	Standard Deviation	Dispersion coefficient	Priority
Your assessment of the strength of your home in the face of crises such as earthquakes	32/6	25/3	26/6	12/8	2/9	2/2812	1/1329	0/4966	9
Access to hospital, emergency, pharmacy, clinic medical centers	19/5	30/5	26/6	17/4	6/0	2/5990	1/1587	0/4458	1
Access to educational centers (schools, kindergartens, universities)	23/2	25/5	28/4	14/8	8/1	2/5911	1/2208	0/4711	5
Access to aid agencies	25/5	19/5	30/2	18/2	6/5	2/6068	1/2280	0/4710	4
Access to military-security center	25/8	30/7	27/3	12/0	4/2	2/3802	1/1153	0/4685	3
Access to firefighting	18/5	19/3	25/8	21/4	15/1	2/9531	1/3237	0/4482	2
Access to public transport	33/9	19/3	27/1	15/4	4/4	2/3724	1/2196	0/5140	12
Access to parks and green spaces and evacuation routes	32/0	20/8	23/4	12/5	11/2	2/5000	1/3480	0/5392	15
Access to the main thoroughfare network	30/5	22/4	25/3	15/9	6/0	2/4453	1/2399	0/5070	10
Your awareness of natural hazard areas	30/7	22/1	27/3	12/8	7/0	2/4323	1/2414	0/4991	8
Your awareness of dangerous human areas	35/4	24/7	24/0	11/2	4/7	2/2500	1/1852	0/5267	14
Quality of building materials and buildings	32/8	24/7	24/5	11/7	6/2	2/3385	1/2220	0/5225	13
Sustainable water access during and after the crisis	25/5	29/7	22/9	14/6	7/3	2/4844	1/2219	0/4918	7
The condition of your residential building in terms of strength and depressibility	33/6	22/4	21/4	8/9	13/8	2/4688	1/3896	0/5628	16
Proportion of the width of the passageway that is accessible to you in times of crisis	26/6	21/9	24/0	13/8	13/8	2/6641	1/3650	0/5123	11
Construction and human density	23/7	27/6	28/6	12/0	8/1	2/5312	1/2044	0/4758	6

4.2.3 Statistical Characteristics of Research Variables

The statistical characteristics of the research variables are given in Tab. 4. Social resilience has an average of 2.5917, economic resilience has 2.3776, institutional resilience has 2.5325, infrastructure resilience has 2.4937 and urban resilience has an average of 2.3786. Then, to ensure the statistical distribution of the studied variables was normal, the Kolmogorov-Smirnov fit test was used. When checking the normality of the data, the null hypothesis is based on the fact that the data distribution is normal, which was tested at a 5% error level. Therefore, if the test statistic is greater than or equal to 0.05, then there is no reason to reject the null hypothesis that the data is normal. In other words, the data distribution will be normal. Considering that the significance levels of all variables are above 0.05, the assumption that the distribution of variables is normal was accepted.

Table 4 Test to check the normality of the distribution of research variables

Variable	Mean	SD	KS	DoF	S
Social resilience	2/5917	0/8214	0/258	383	0/074
Economic resilience	2/3776	0/8008	0/270	383	0/051
Institutional resilience	2/5325	0/8535	0/289	383	0/092
Infrastructure resilience	2/4937	0/8303	0/267	383	0/083
Urban resilience	2/3786	0/9975	0/293	383	0/105

4.3 Inferential Findings

4.3.1 Single Sample t-Test

In this study, a one-sample t-test was used to investigate the status of urban resilience components in Islamshahr. Findings showed (Tab. 5) that social resilience with an average of 2.5717, economic resilience with an average of 2.3776, institutional resilience with an average of 2.5325, infrastructure resilience with an average of 2.4377 and urban resilience with an average of The average of 2.3786 is less than the test value (3) and as a result, urban resilience and urban resilience components in Islamshahr city are at a low level. Also, the negativity of the lowest and highest limits about urban resilience and all components of resilience means that the average of the variable in the community is less than the test value and these variables are at a low level in the study population.

Table 5 Sample t-test results

Test value=3							
Variable	*t*	DoF	Mean	*S*	Mean difference	Assurance difference %95	
						Min	Max
Social resilience	15/229	383	2/5917	0/000	-0/4082	-0/7028	-0/5420
Economic resilience	9/727	382	2/3776	0/000	-0/6224	-0/4908	-0/3257
Institutional resilience	10/735	383	2/5325	0/000	-0/4675	-0/5532	-0/3819
Infrastructure resilience	11/950	383	2/4937	0/000	-0/5063	-0/5897	-0/4230
Urban resilience	12/192	382	2/3786	0/000	-0/6214	-0/7216	0/5212

4.3.2 Friedman Test

Friedman test was used to rank the components of urban resilience (Tab. 6). The value of chi-square statistic in this test was 44.919 and the significance level was 0.000. Therefore, the components differ from the average and can be ranked. According to the average rankings of components, social resilience is in the first place, institutional resilience is in the second place, infrastructure resilience is in the third place and economic resilience is in the fourth place.

Table 6 Friedman test results

Variable	Average rating	Rank	Chi-square	DoF	S
Social resilience	2/77	1	44/919	3	0/000
Economic resilience	2/16	4			
Institutional resilience	2/57	2			
Infrastructure resilience	2/50	3			

5 DISCUSSION

Urban resilience is a relatively new concept in urban studies and urban planning. Resilience is derived from biological discipline, which determines the ability of a system's organism to withstand a shock, disaster, and disease, and to recover from it. As a result, in general, the definition of urban resilience or resilience can be interpreted from the perspective of an urban crisis to the ability of a region or urban system to withstand a wide flood of shock and tension. Because today, urban spaces can best play the role of centers of collective life. The aim of this study was to evaluate the economic and institutional-physical resilience of Islamshahr to identify the capacity and ability to return it at the time of and after accidents.

The results of measuring the economic, institutional and infrastructure dimensions in measuring the urban resilience of Islamshahr against natural hazards showed that the frequency of economic dimension is very low, 27.41, low 27.83, medium 28.86, high 11.31 and 57 / 4 is very marked. Therefore, according to the final score of the economic dimension level, according to all its components and criteria, it is moderate and has a tendency towards low spectrum. Also, the degree of job vulnerability and loss in the event of an earthquake has been a priority. The frequency percentage of social dimension is 26.73 very low, 24.12 low, 26.02 moderate, 15.48 high and 7.67 very high. Therefore, according to the final score, the level of social dimension is moderate according to all its components and criteria and has a very low tendency towards spectrum. The frequency percentage of the infrastructure dimension is 18.18 very low, 24.15 low, 25.84 medium, 19.71 high and 7.83 very high. Therefore, according to the final score, the level of social dimension is moderate according to all its components and criteria and has a very low tendency towards spectrum. Findings obtained from the above studies are in line with the study of [16] which showed that the average resilience rate is 2.23 and indicates that in general the study area in terms of resilience in a completely It is not desirable. The results are also in line with the study of [13] which showed that in terms of economic dimension, there is a downward trend in the rate

of resilience. Also, the results are consistent with the findings of [15] which showed that among the various dimensions of resilience, institutional and then physical-spatial is in an unfavorable position. The results of measuring the economic and institutional dimensions showed that the city of Islamshahr is moderate to low against natural hazards according to all its dimensions, components and criteria, while the same amount has different values in different areas and in worn-out areas and Informal settlements are the lowest, which indicates very unbearable conditions in areas such as Mianabad, Ahmadieh and Faizieh in terms of economic-physical resilience. Despite recent measures, the dependence of Islamshahr city in terms of services and political and economic performance to Tehran has also had the highest negative coefficient on urban resilience.

6 CONCLUSION

Findings of one-sample t-test showed that social resilience with an average of 2.5717, economic resilience with an average of 2.3776, institutional resilience with an average of 2.5325, infrastructure resilience with an average of 2.4377 and urban resilience with an average of 2.3786 and as a result, urban resilience and the components of urban resilience in Islamshahr city are at a low level.

The results of Friedman test in the dimension ranking section showed that the social dimension is in the first place of importance and the economic dimension is determined as the least important dimension. The results of the analysis in this section are in line with the results of the study of [17] which showed the highest level of economic dimension, physical-environmental and institutional-managerial dimension of the second level, infrastructure dimension of the third level, social dimension of the fourth level. And the lowest level, the environmental dimension. The results are also in line with the findings of [6] whose findings show the unfavorable living conditions and its dimensions in the region, the difference between neighborhoods in terms of livability and the greater impact of the economic dimension on the living conditions of the region and neighborhoods.

Considering the importance and necessity of the issue of resilience of communities, in this study, in order to increase the resilience of cities around Kalamshahr, Tehran has presented the following suggestions:

- Increase scientific studies and integrated system research of the center and coordinate to identify and reduce the threatening factors of communities living with the priority of earthquake and subsidence risk.
- Establishment of a joint secretariat for urban resilience in and around the metropolitan area for consolidation and coordinated measures.
- Investing in the field of culture and promoting the intellectual level of society, especially for children.
- Increase the capacity of institutions and create more coordination between departments.
- Increase and update existing standards for resilience of society using knowledge and innovation.

7 REFERENCES

[1] Moazam, A., Kuhestani, A., Kuhestani, M., & Barzgari, M. R. S. K. (2013). Managing the Elderly Texture with Resiliency Approach. *Fifth International Conference on Integrated Management of Natural Disasters*, 937-937. (in Persian)

[2] Bingeman, K., Berke F., & Gardner, J. S. (2004). Institutional responses to development pressures: Resilience of social-ecological systems in Himachal Pradesh, India. *International Journal of Sustainable Development & World Ecology, 11*(1), 99-115. https://doi.org/10.1080/13504500409469815

[3] Berke, P. R. & Campanella, T. J. (2008). Planning for Post-Disaster Resiliency. *Annals of the American Academy of Political and Social Science*, 604, 192-207. https://doi.org/10.1177/0002716205285533

[4] Roozitalab, A. (2022), Employing strategic management to study the effect of brand awareness on customer's loyalty: Exploring the mediation effect of perceived brand quality and brand communication: A study of Samsung Electronics Company in Tehran branch. *SMART Journal of Business Management Studies, 18*(1), 38-46. https://doi.org/10.5958/2321-2012.2022.00005.7

[5] Dogulu, C., Karanci, N. A., & Ikizer, G. (2016). How do survivors perceive community resilience? The case of the 2011 earthquakes in Van, Turkey. *Journal of Disaster Risk Reduction*, 16, 108-114. https://doi.org/10.1016/J.IJDRR.2016.02.006

[6] Eskandari, M. A., Shojaee, E., & Habibi, K. (2013). Resiliency Assessment Model for Earthquake Therapeutic Centers. *Fifth International Conference on the Integrated Management of Natural Disasters*, p. 1117

[7] Forgette, R. & van Boening, M. (2009). Measuring and Modeling Community Resilience: SERP and DyME. For Internal Distribution Only. *Final SERRI/DHS distribution review pending*. 10/01/2009.

[8] Gonzales, P. & Ajami, N. K. (2017). An integrative regional resilience framework for the changing urban water paradigm. *Sustainable Cities and Society, 30*, 128-138. https://doi.org/10.1016/j.scs.2017.01.012

[9] Hamzehi Tehrani, M., Jagherg, S. A. S., & Zaman-Moghaddam, A. (2015), Identifying and prioritizing factors affecting organizational resilience in dealing with crisis among Rasht hospitals. *The 2nd International Conference on Modern Paradigms of Management, Innovation and Entrepreneurship*, 136-121.

[10] Martinelli, D., Cimellaro, G. P., Terzic, V., & Mahin, S. (2014). Analysis of Economic Resiliency of Communities Affected By Natural Disasters: The Bay Area Case Study. *The 4th International Conference on Building Resilience, Building Resilience, Economics and Finance, 18*, 959-968. https://doi.org/10.1016/S2212-5671(14)01023-5

[11] Meerow, S., Newell, J., & Stults, M. (2016). Defining urban resilience: A review. Landscape and Urban Planning. *Landscape and Urban Planning, 147*, 38-49. https://doi.org/10.1016/j.landurbplan.2015.11.011

[12] Norris, S. P. et al. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology*, *41*, 127-150. https://doi.org/10.1007/s10464-007-9156-6

[13] Ostvar Izadkhah, Y. (2012), Resiliency concepts and models in natural disasters. *Journal of Crisis Management and Prevention, 2*(2), 145-153.

[14] Rezaei, M., Rafieian, M., & Hosseini, S. M. (2013), Measurement and Evaluation of the Physical Resiliency of Urban Communities against Earthquakes (Case Study:

Neighborhoods in Tehran). *Human Geography Research, 47*(4), 139-145.
[15] Akhmetova, G. T., Moldasheva, A. K., Oteshova, A. K., Nurpeiis, G. S., & Kassanova, A. G. (2021). Optimization of Profit, Risk and Service Level in Designing a Closed Loop Supply Chain Network by Considering the Location of Competitive Facilities in Uncertainty Conditions. *Industrial Engineering & Management Systems, 20*(4), 501-508. https://doi.org/10.7232/iems.2021.20.4.501
[16] Mojtaba, R., Rezai, M. R., Asgari, A., Parizgar, A., & Shayan, S. (2011). Conceptualization of Resilience and its Indicators in Community-Based Disaster Management. *Journal of Planning and Space Administration, 15*(4), 41-28.
[17] Afanasyev, V. Y., Ukolov, V. F., & Kuzmin, V. V. (2021). A Power Industry Planning Problem in the Workshop Flow System with the Aim of Reducing Energy Consumption and Delay Time. *Industrial Engineering & Management Systems, 20*(4), 529-535. https://doi.org/10.7232/iems.2021.20.4.529
[18] Tierney, K. & Bruneau, M. (2007). Conceptualizing and measuring resilience: a key to disaster loss reduction. *TR News* May-June, 14-17.
[19] Rumbach, A. & Foley, D. (2014). Indigenous institutions and their role in disaster risk reduction and resilience: evidence from the 2009 tsunami in American Samoa. *Ecology and Society, 19*(1), 19-29. https://doi.org/10.5751/ES-06189-190119

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