Urban Decay Vulnerability Mitigation Strategies Against Earthquake Case Study: Imamzadeh Hasan Neighborhood in Tehran

Bahram Imani*
Reza Kanooni**
Mohammad Biniaz***
Ahmad Alimohammadi****

Abstract

Vulnerability of cities to environmental hazards in countries with high-risk environments has become a significant challenge ahead of urbanology, engineering management, and urban planning. One of these dangers threatening many cities around the world including our country is earthquake. Necessity to reduce vulnerability to earthquakes was considered as one of the main purposes of spatial planning, urban planning, and urban design. Tehran, as the capital city of Iran with an important and critical situation, has a large zone of distressed areas most of which are located on a major fault and are considered as a serious threat to the city and its inhabitants. Therefore, it was necessary to study of vulnerabilities in old neighborhood of Imamzade-Hasan. The purpose of this study was to develop strategies for organizing these textures and to reduce their vulnerability to earthquakes using SWOT model and QSPM matrix. It is an applied- strategic research conducted by a descriptive- analytical method. In addition to several library studies, it has also taken advantage of a survey. To collect and evaluate information of the survey, Delphi technique, questionnaires, and interviews with experts and officials have been used. The findings suggest that the worn-out urban fabric of Imamzade-Hasan neighborhood needs to be pushed out of the status quo, that is, its weaknesses should be recognized, and its threats need to be addressed. Several strategies such as renovation and improvement programs, special attention on crisis management, creation of a central agency to regulate programs related to rusty textures, establishment of appropriate contexts for increasing economic activities in the neighborhood, providing infrastructure to attract investments to modernize the neighborhood, and increasing green open spaces were identified as the high priority strategies, and implementation of reconstruction and renovation programs for providing adequately wide roads necessary for ensuring improved mid- and post-crisis services was determined as the most effective strategy for addressing the problems of this neighborhood.

Keywords

Urban Decay, Vulnerability, SWOT, QSPM Matrix, Imamzadeh Hassan Neighborhood.

*. Assistant professor of Department of Geography and Urban and Rural Planning, University of Mohaghegh Ardabili, Ardabil, Iran. bahram_imani60@yahoo.com
**. MSc. Geography and Urban Planning, Shahid Beheshti University, Tehran, Iran. Rezakanooni@yahoo.com
***. MSc. Geography and Urban Planning, Shahid Beheshti University, Tehran, Iran. mohamad.biniaz@yahoo.com
****. MSc. Geography and Urban Planning, Shahid Beheshti University, Tehran, Iran. ahmad.am.1991@gmail.com

The Scientific Journal of NAZAR research center (Nrc) for Art, Architecture & Urbanism

Introduction

Modern cities around the world are constantly exposed to risks of natural disasters for various reasons including inadequate location, poor physical development, and failure to comply with the necessary standards and so on. One of the dangers that threatens many cities in the world is earthquake. Earthquakes have always been sought as the most dangerous of natural hazards and have always been involved with tremendous risks. The risk of earthquake is an expected damage due to which harm is done to elements of society or environment (Rahnama and Talei, 2011: 52). Iran is located in the orogeny path of alpine-the Himalayas were (UNDP, 2004: 35). Principled attention to the issue of crisis management is an obvious issue, because during the years 1900 to 2000 this country has been among the six countries that have suffered the casualties caused by the quake. Studying the geographical location of Iran's cities points out the fact that these cities are located in the path of major and minor faults as well as in the path of various catchment basins, which highlights the need for adoption of necessary measures to deal with probable floods and earthquakes (Faraji and Gharakhlou, 2009: 146). Iran's being located in areas with high earthquake risk in the world and the existence of densely populated parts has made Iran highly vulnerable to earthquakes. Excessive growth of population, urban construction and development, and progression of city boundaries toward suburban areas, without proper planning and devising necessary measures and laws has doubled the severity of this crisis. With all these, the precise identification of the problem and reviewing its various aspects in Tehran as the capital and metropolis of the country is of vital importance. Among the most populated cities in Iran, Tehran metropolis has a special status, and regarding political, social, economic, and security issues etc., Iran capital is the most important city in Iran and the crisis in this city may become a national disaster. Central and southern Tehran includes the historic

and old core and also includes a collection of various fabrics and different urban spaces and is almost in the geographical middle of two major faults of north and south of Tehran and in the middle of this plain. Housing and urban fabrics located in this section, due to their historical traits can physically be drastically damaged by earthquake imbalance and bring about urban life crisis. In such a situation earthquake threatens all areas of the city, especially the old and central contexts (Monzavi, et al, 2010: 2). More than a third of southern areas of Tehran are considered as worn-out fabric, and the close proximity of Rey Fault means that if activated this fault can destroy up to 80 percent of these buildings, leading to loss of 15 to 20 percent of the residents and employees. The main issues that Emamzadeh Hasan neighborhood has with the earthquake can be summarized as decline and erosion, destruction of major fields, urban turbulence, density and mounted dominance, poor permeability, inefficient road network, poor distribution of open and green spaces, and so on. In case of continuation of such problems, we would witness the highest damage and casualties about which correct assessments and measure must be taken. Focusing on the structural measures to reduce seismic vulnerability is not enough, but through establishing relationship between urban planning and earthquake risk management, one can assess seismic vulnerability and have more complete and accurate risk assessment and start to develop strategies and programs to deal with earthquake. Imamzadeh Hassan is located in Region 17, Tehran where neighborhood fabric, with a density of 361 persons per hectare, has a density higher than the average level of the region. Type and composition of neighborhood elements, especially the residential units, are the same in pieces shape in 80 to 120 square meters, so the fabric of the neighborhood can be considered as vulnerable fabric. As a result, during a probable earthquake a lot of damage is imposed. This study tries to take a step towards reducing the vulnerability of worn-out fabrics by identifying problems of Imamzadeh Hassan worn-out neighborhood and developing the

best strategies.

Research Background

Attention has been given to planning to reduce vulnerability to earthquake damage in cities and worn-out fabrics since the early 80s (Jones, 1982). Urban planning and designing were simultaneously considered in reducing seismic vulnerability in urban areas in the mid-80s (Ye, 1984). A joint study has been conducted by America and Japan through a partnership with the University of Hawaii and the Architectural Institute of Japan and also another one by America and Italy through cooperation of the University of Washington and Rome (Heikkala, 1982). In those studies, the issue of land use, its relation to earthquake risk reduction, and interaction of various urban components in the behavior of urban systems have been taken into consideration. The first study in connection with plans to reduce the effects of earthquake in Tehran, the most comprehensive one, is Tehran zoning project in cooperation with Japan International Cooperation Agency (JICA), which was from April 1999 to December 2000. In this project, as its name implies, vulnerability resulting from the four earthquake models of North Tehran fault, Rey fault, Mosha fault and floating model was estimated for Tehran. JICA studies despite the significant engineering structure have no particular emphasis on the urban fabric and its output is achieved at urban sub-zones scales (JICA, 2000). In this regard, research has been done with the same subject, say, Esmail Nasiri (2013) in an article entitled "Analysis of worn-out urban fabric spatial-location instability in Region 10 in Tehran" has concluded that more than 97 percent of housing components of these fabrics is of less durable parts. Moreover, physical indicators and poor distribution of land uses have been reported as the main reasons behind the instability of worn-out fabric in the studied region; Saeed Falah Ali Abadi (2013) in an article entitled "Assessment of vulnerability of historical parts of towns against earthquake using Analytical Hierarchy Process and Geographic Information Systems, a case study of

Murray Fahadan neighborhood" concluded that about 65 percent of the area of the neighborhood has a high, 20 percent has average and the rest of the area neighborhoods has low vulnerability. He suggests that, due to the distribution of high vulnerability places all over the neighborhood, it is necessary to assess all areas in order to strengthen preparedness against earthquake and operations and to take actions to reduce the risk of earthquakes.

Theoretical Foundations
• Worn-out fabric and its features

Aging and the consequent wear-out is one of the most important issues related to urban spaces, as it leads to disorganization, lack of balance, lack of fitness, and disproportionality (Eskandarpour, et al, 2011: 146). The process by which the physic and function of urban areas undergo a form of transformation, disorganization, imbalance, and decline in urban life is called the wear-out of urban fabric (Nasiri, 2013: 271). Worn-out urban fabrics are those parts of the urban fabric whose physical and functional qualities have been reduced and impaired. Once urban life of a part of a city undergoes a recession for any reason, urban fabric of that area becomes subjected to the process of wear out. The most important feature in these fabrics is lack of spontaneous modernization due to residents' poverty and the lack of incentives for investors, because of no guarantee for return on capital (Razavian, et al, 2013: 41). The existence of large areas of urban worn-out fabric is not a new concept but its problems are important now because of the pressure of globalization, financial crisis, rivalry between the cities and the emergence of an information society. This problem in itself is worrying because by their prevalence safety, stability and integrity of the cities are weakened (Muller & Bentivenga, 2006: 5). The basic criteria for identification of such fabrics are as follows:

1. Buildings life: More than eighty percent of the buildings in these fabrics have a history of more than 50 years.

2. Graining: Residential buildings located

in such fabrics are mostly fine grained and their surface area is less than 200 square meters on average (Habibi et al, 2010: 66). Fine fabric represents the compactness of the fabric and the multitude of small blocks with small area (Ameri Siahoui, et al, 2011: 23).

3. Type of materials: Materials used in these fabrics are mostly adobe, clay brick, wood and or brick and iron without regard to horizontal and vertical joints and without structural systems.

4. Number of floors: Most of the buildings in this fabric are one or two floors.

5. Access condition: Worn-out fabric, created mostly without previous designs, mostly have irregular structure and access is mostly on foot, so that most of routes are dead-end streets or with less than 6 meters width and permeability is low (Habibi, et al, 2010: 66).

• **Urban Vulnerability**

Urban growth triggers the emergence and provision of many facilities, but at the same time leads to heightened crises and causes the positive environmental facilities to be transformed into negatives (Nakabayashi, 1994: 225). Today, the vulnerability of cities and especially old and worn fabric against earthquake has become a global issue various professionals in the world face. This situation, in countries with natural risky structure, including Iran, has become more critical in recent decades (Monzavi, et al, 2010: 2). Evidence suggests that earthquake threat in urban areas is expanding globally and this threat with a growing trend is one of the problems of developing countries (Boroumand and Amini, 2012: 112). Urban vulnerability against natural disasters like earthquakes is a function of human behavior that indicates the degree of being influenced or the resistance of socio-economic units, and physical assets against natural hazard. Vulnerability is the probability that a person or a group are at risk of adverse effects of a risk that in fact, it is an interaction between spatial risks with social forms of societies. Although earthquake has been recognized as one of the most complex natural phenomena, and

in recent years with increased knowledge of the causes of earthquakes it is discussed, predicting its imminent happening time still remains shrouded in mystery. That is why we must think of deliberate and appropriate measures to reduce human habitat vulnerability and make the ways to deal with the earthquake problem pervasive among societies (Shams, et al, 2011: 45-46). The most fundamental theory in planning to reduce the vulnerability of land-use is to avoid developing urban land development on lands that are at risk. Moreover, the compatibility and utility of placement of urban land use must also be considered in the sense of not putting together high-risk uses such as gas stations with dense residential centers and the frontage of these sensitive centers are observed (Abdullahi, 2001: 43-45). High density that is of criteria related to spatial and physical structure in identifying the old urban fabric means low outdoor living space and private open space for each individual or each family (Majedi, 2010: 88). Density Indicates overcrowding and building density on the surface and represents the open space that can be used. Moreover, there is a direct relationship between density decrease and increase of the costs of providing infrastructure and public services (Azizi, 2003: 34). The inadequate level of access to urban services, which is another mentioned criterion, refers not only to the inadequacy of road network, but also to lack of education, health, culture, and green spaces; so one cannot expect to improve the urban services in worn-out fabric merely with reconstruction of road network, and in effect neglecting other services desired by residents (Majedi, 2010: 89). Due to the increasing occurrence of natural disasters, especially earthquakes in recent centuries in different parts of the world and thus the increase in losses, damages and injuries caused by accidents and damage, reduction of damage due to natural phenomena and increasing resistance and preparedness against disasters have received great importance (Zangiabadi, 2009: 92). In the worn fabrics, the resistance of the buildings is low due to worn with high building density, in case of earthquake, relief and rescue operations take

place slow due to special high density and narrow passages (Teimuri, et al, 2010: 3). Disaster planning is known as one type of urban planning and is a comprehensive process for disaster preparedness and response in the face of disaster, which is carried out in the period before and after accident the accident. Planning before the accident is a set of measures that prevents or reduces the effects of the accident and planning process after the accident is in order to determine the necessary actions after the accident, so that the available resources can optimally be used (Hataminezhad, et al, 2009: 2). Systematic approach to secure old fabric is inevitable. The ultimate goal of securing the worn out fabrics is spatial justice and the general principles governing it are: time consistency, and functional physical intervention, intervention with minimal effect on the historical context and the use of some kind of social engineering planning based on empowering approach and hedging risks in the city (Ziyari, et al, 2012: 4).

• **Views related to crisis management**

-Behavioral school theories

Behavioral approach focuses on creating and aggravating incidents, as a result, it emphasizes the non-principled human behavior (cutting trees, overgrazing, building on the critical points, etc.). This approach has stressed the active role of technology and science in the prevention of accidents; however, as this view puts excessive stress on the role of decision-makers and victims of and deals with broader areas of social and economic power, it has been criticized.

- Structural school theories

Structural approach has been proposed through the relationship between disasters and underdevelopment and economic dependence of the Third World. In principle, the idea exists that the increase of calamities of the developing and less developed countries is more due to the attention of people to global economy, the spread of capitalism and the marginalization of the poor and oppressed rather than because of geophysical accidents. As a result, proponents of this view prefer to discuss the issue of natural disasters and social, political, and economic progress of less developed countries for a clearer and better recognition of the issue (Shams et al, 2011: 46-47).

Research methodology

This study is descriptive-analytical. To collect information and data required, documents, library studies, and field studies have been used and according to the information obtained, the weakness and strength points, opportunities, and threats in Imamzadeh Hassan neighborhood in region 17 have been dealt with. To analyze the findings and to provide strategies, SWOT model is used. For this purpose, internal factors (strengths and weaknesses) and external factors (opportunities and threats) of the area were studied, and then to complete the information obtained, Delphi method was used. In this method, 20 experts on the subject of worn fabric and crisis management were consulted that by giving weight to the intended points and average weight, SWOT matrix was completed and finally appropriate strategies and solutions were provided to organize worn fabric of Imamzadeh Hassan neighborhood.

- Introduction of the study area

Imamzadeh Hassan neighborhood is located in region 17 of Tehran. Region 17 contains 3 areas and 21 neighborhoods and triangular shaped Imamzadeh Hassan neighborhood with an area of 24.5 hectares is the third neighborhood of area one, located in the northern area (Fig. 1.). The existence of effective elements of Imamzadeh Hssan neighborhood, proximity to the town center, proximy to e m ployment centers of West Tehran, and the exis t ence of four major communication centers and d eployment of three regional markets in surro unding neighborhoods are of obvious features of t h e neighborhood. Although according to Cens u s in 2006, the local population has been 8117 people, and it has had younger population comp a red to region 17, the employment rate is lowe r . The existence of demolished structures, endo w ed lands, public institutions and lively commer cial centers are of the other features of this
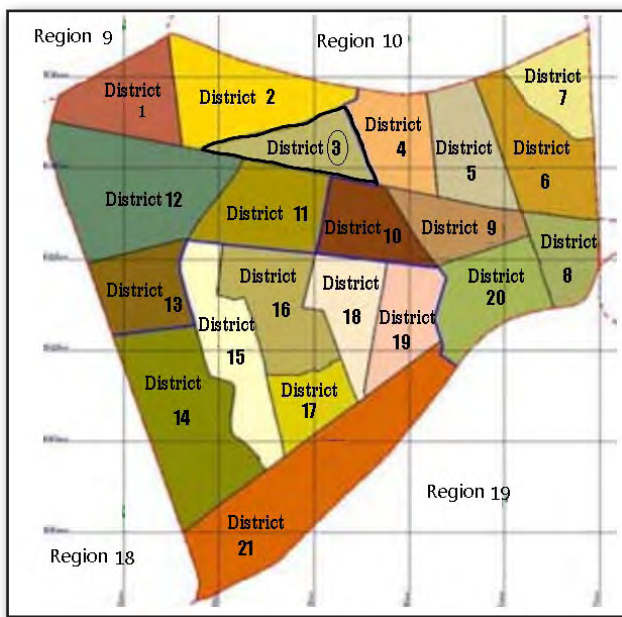
Fig. 1. Location of Imamzadeh Hassan neighborhood in Region 17, Tehran. Source: Comprehensive Plan of Tehran, 2006.

area (Mohammadi Aydagmish, et al, 2013: 43-44).

Discussion

SWOT model is one of the strategic tools for matching within-system strengths and weaknesses with outside-system opportunities and threats (Harrison and Caron, 2003: 192). This model (SWOT) is one of the methods used to organize external factors in categories of opportunities and threats and internal factors such as strengths and weaknesses. This method is for the analysis of affective factors and processing a system (city, district, village, etc.) using the calibration factors according to the importance given to each of the factors. (Nastaran and Houshmandfar, 2010: 62). The ultimate goal of the strategic planning process by SWOT is to develop and adopt an appropriate strategy by taking into account internal and external factors (Ismailzadeh, et al, 2014: 22).

• Internal factors evaluation (IFE)

In this step, the strengths and weaknesses are identified, in the columns of evaluation matrix of internal factors. Evaluation of the internal area is to detect strength and weakness points. Strengths and weaknesses are of the controllable activities of fabric that at any time benefit or harm the fabric. The process of evaluating internal factors is parallel to the evaluation of external factors.

• External factors evaluation (EFE)

In this step, opportunities and threats identified are set in the rows of external factors evaluation matrix. This step explains and describes the external environment in order to identify the opportunities and threats that the fabric faces. In this regard, economic,

Table 1. Total specifications of respondent experts and officials. Source: authors.

	Gender		Level of education				Experience			Major						Level of familiarity with Imamzadeh Hassan Neighborhood				
	Man	Woman	Diploma	BS	MSc	Ph.D.	(Under 5 years)	(10-5)	(Over 10 years)	Geography Sciences (Geography and Urban Planning)	Urban Design	Urban Management	Urban planning	Improvement and Renovation	Other majors	Very high	High	Moderate	Low	Very low
Experts	7	3	-	-	2	8	1	5	4	4	1	1	3	-	1	1	1	4	3	1
Staff	6	4	-	6	3	1	3	4	3	3	-	-	2	-	5	3	4	2	1	-

social, technological, and managerial trends and events along with nature and location of different interest groups including citizens and other factors that could greatly benefit or harm the region in the future are evaluated. (Hosseini, et al, 2013: 82-83). In this respect, the opinions of 20 experts (especially faculty) and staff (Table 1) were used for weighing the internal and external factors that finally after summation and average weight provided by these groups, the final weight with grading and the final score were calculated based on SWOT model. (Tables 2 and 3).

The results of the prioritization of strengths, weaknesses, opportunities and threats as well as the assessment of external and internal factors evaluation matrix show that the strengths S_4 that is in high sense of belonging to the neighborhood because of long residence history is the most important strength point in fabric. Moreover, W_2 that is lack of open spaces between the blocks and intensive residential use and a lack of green open spaces and lack of parking are as the most important disadvantage of the fabric. In the context of the opportunities, O_8 that is financial support through religious beliefs (endowment, charitable, loan) that has the highest final score in opportunities can be note. About threats, T_5 that is ignoring the role of people in participation in decision-making has the priority with the highest rating.

• **Internal and External Factors Evaluation Matrix**

For overall assessment of the worn fabric of Imamzadeh Hasan neighborhood, according to the

Table 2. Internal factors evaluation (IFE). Source: authors. (Note that the total score weight of internal factors is 1 and their score weight is 3.19 points.)

Strength points (S)	Weight	Grading	Weight score
1) Open space around Imamzadeh Hasan neighborhood	0.05	3	0.15
2) The connection and proximity to main roads	0.06	3	0.18
3) Neighbor's having local and regional markets	0.04	2	0.08
4) High sense of belonging to the neighborhood because of long residence background	0.07	4	0.28
5) The commercial and pilgrimage characters have caused the presence of the people in the neighborhood to be associated with leisure	0.04	2	0.08
6) Convergence because of socio-economic and cultural similarities of the fabric's residents	0.05	3	0.15
7) Neighborhood's adjacency to the railroad	0.05	2	0.10
8) The existence of public institutions	0.03	3	0.09
9) Approximately the same and low height of buildings in the fabric	0.04	4	0.16
10) The proper slope and topography status	0.06	3	0.18
Weaknesses (W)	Weight	Grading	Weight score
1) Environmental pollution caused by the railway crossing, and the existence of some factories	0.04	3	0.12
2) Lack of open spaces between the blocks and intensive residential use and a lack of green open spaces and lack of parking	0.07	4	0.28
3) Access through narrow neighborhood and deadlock and lack of car access to these spaces	0.07	3	0.21
4) Long life of the buildings and worn of residential buildings	0.05	3	0.15
5) Lack of resistance of buildings against earthquakes	0.06	4	0.24
6) Lack of suitable green and open spaces	0.05	4	0.20
7) Disturbance of urban landscape and inappropriateness of pieces due old and organic fabric	0.04	3	0.12
8) Unavailability of fire extinguishing systems in housing units	0.06	4	0.24
9) The existence of criminal behavior and insecurity in certain parts of the fabric	0.03	2	0.06
10) Adjacency of residential uses of the neighborhood with large workshops	0.04	3	0.12
Total	1		3.19

Table 3. External factors evaluation (EFE). Source: authors. (Note that the total weight score of external factors is 1 and their weighting score is 2.96. Assessment carried out in this stage is analyzed in the next step.)

The opportunities (O)	Weight	Grading	Weight score
1) The existence of service, transportation, and commercial workshops surrounding the fabric with regional and even trans-regional role	0.05	3	0.15
2) The positive role of NGOs in the planning and management of neighborhood	0.06	4	0.24
3) The existence of railway and taking advantage of them	0.05	3	0.15
4) Growth potential due to proximity to major activity centers	0.04	3	0.12
5) The high level of participation in organizing the fabric by owners through financial and credit facilities	0.05	3	0.15
6) Use of open space around Imamzadeh Hassan	0.04	2	0.08
7) The presence of local and beyond regional markets in order to create jobs	0.04	2	0.08
8) Financial support through religious beliefs (endowment, charitable, loan)	0.07	4	0.28
9) Converting Imamzadeh Hassan to symbol of the area and increase of tourists	0.06	3	0.18
10) Multi-centeredness of the neighborhood for creating pavements	0.03	2	0.06
The threat (T)	Weight	Grading	Weight score
1) Being located on earthquake fault zone	0.07	3	0.21
2) The relative decline in the value of land and lack of investment in the neighborhood	0.05	2	0.10
3) Rising of most underground water aquifers	0.05	3	0.15
4) Social damage such as drug trafficking, and creating insecurity	0.04	2	0.08
5) Ignoring the role of public participation in decision-making	0.06	4	0.24
6) Lack of proper coordination between institutions related to the worn region	0.04	2	0.08
7) Ineffectiveness of communication network to facilitate the traffic, especially in times of increasing tourists	0.04	3	0.12
8) The problem of narrow passages in critical condition	0.07	3	0.21
9) Interaction of disparate uses	0.04	2	0.08
10) Lack of infrastructure performance and fine-grained fabric of neighborhood	0.05	4	0.20
Total	1		2.96

assessment of internal and external factors, we use internal and external factors matrix. The final ratio of internal factors is on the horizontal axis, and the final ratio of external factors is on the vertical axis, and the intersection of these two matrixes shows the status of the worn fabric of Imamzadeh Hasan neighborhood in Fig.2.

In Fig. 2, the location of worn fabric of Imamzadeh

Hasan neighborhood from the perspective of the authorities and experts of renovation and modernization are shown. As shown in Figure 1 is a worn fabric of Imamzadeh Hasan neighborhood is in a position that must leave the status quo, which means that it should reduce its weaknesses and avoid threats at the same time. However, given the opportunities that lie ahead, the trend should be taking advantage of
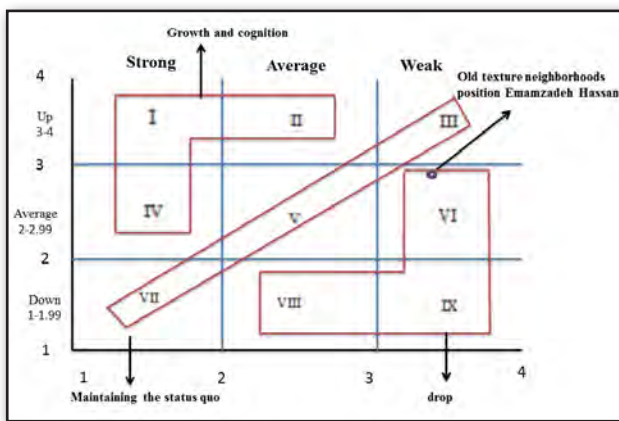
Fig. 2. Location of worn fabric of Imamzadeh Hasan neighborhood. Source:

opportunities and at the same time reducing or coping with the threats. This means that for organizing worn fabric of Imamzadeh Hasan neighborhood, renovation and improvement programs must run, so that in this way while achieving a good organization, the opportunities of the neighborhood can be used. It can be said that strategies selected are mostly defensive strategies.

• **Formulating SWOT strategies**

Strategies are developed to achieve a more favorable position. Developing strategies is based on a combination of four factors involved in the strategic planning, but in practice, some of the strategies overlap with each other, or work simultaneously and coordinated with each other. In fact, according to the status under study, four groups of strategies with different degrees of activism can be formulated:

SO Strategies (strategy offensive): By utilizing the strengths, seeks to take advantage of opportunities.

ST Strategies (strategy diversification): To avoid the threats, it uses strengths.

WO Strategies (view over strategy): By taking advantage of opportunities, reduce weaknesses.

WT Strategies (defensive strategies): It reduces weaknesses and avoids the threats (Table4) ;(Pourahmad, et al, 2013: 9-10).

• **Prioritization of strategies using Quantitative Strategic Planning Matrix (QSPM)**

QSPM is an analytical is an analytical method by which the relative attractiveness of strategies is

determine d . By this method, one can objectively determine different strategies that are among the best strategies. To provide this matrix, the matrix of internal and external evaluation of factors and SWOT matrix ar e used. In this way, the opportunities, external t hreats, strengths, and weakness are written i n the right column of planning matrix, and then t he coefficient obtained in the evaluation matrix is written the column before it. The appeal is determi ned at a later stage. To determine appeal score, th e internal and external factors contributed to the su c cess of the organization must be to determine d and then determine their appeal to the strategie s . In other words, the role of the factor in the selection of strategies should be determined. The appeal sc ore is from 1 (without appeal) to 4 (very appealing) is. The appeal score is determined and applied by the survey of Delphi Group, then appeal score is multiplied by the coefficient factor, and the sum of ap peal score identifies the strategy priority (Pourahmad, et al, 2013: 11).

In standa r d mode, the total scores of each strategy represent a superior strategy. Here, based on their priorities for the organization of Imamzadeh Hassan worn fabr i c, strategies can be divided into three categorie s and run each strategy by considering its priority i n solving the issues and problems of the worn fabric fast.

1- SO_1, WT_3, WT_1 WO_2, WT_5

2- ST_4, WO_3, ST_3, SO_5, WT_4, WO_5

3- SO_2, WT_2, ST_5, WO_4, WO_1, SO_4, SO_3, ST_2, ST_1

Based on t he results obtained, defensive strategies (WT) have greater impact on organizing Imamzadeh Hassan wo rn fabric and three strategies of the five strategie s chosen are from this section. This means that strategies must develop that reduce weaknesses and avoid threats. Of course, one should not ignore WO and SO strategies that show the importance of opportuni t ies and the opportunities ahead must be used to reduce weaknesses and threats.

WT_1 strat e gy is the most effective strategy in organizin g Imamzadeh Hassan worn fabric. Implement a tion of reconstruction and renovation

Table 4. Strategies proposed to reduce the vulnerability of worn fabric in Imamzadeh Hasan neighborhood against earthquake. Source: authors.

WO strategies	SO strategies
WO_1: managers and planners attention to fabric appearance and pavement through the beautiful and appropriate design WO_2: using railroad space to create suitable green and open spaces WO_3: use of partnerships, NGOs and religious people to retrofit and renovate the buildings WO_4: utilizing regional markets in order to increase employment and to reduce criminal behavior WO_5: the possibility of utilizing public funds (endowments, charities and loan) to enhance fabric repair and improvement	SO_1: Creating spaces for the participation of local people and increasing economic functions in order to affect the fabric SO_2: lending and long-term loans in line with the active participation of the public SO_3: bed to increase the activity of NGOs and religious centers approach for fabric regeneration SO_4: organizing spaces around the railway line for use in critical condition SO_5: taking advantage of the existence of Imamzadeh Hasan in order to attract tourists and economic prosperity with a view to organizing and fabric regeneration
WT strategies	**ST strategies**
WT_1: the implementation of reconstruction and renovation of the neighborhood in terms of widening the passages to serve in critical condition WT_2: the use of public spaces and increasing the participation of local residents in decision-making and physical-spatial link to reduce criminal behavior and insecurity in the fabric WT_3: reducing the number of decision-making centers in worn areas in order to implement programs related to retrofitting buildings against earthquakes WT_4: applying the rules and regulations of urban planning projects for the widening of roads and the lack of interference from disparate uses in fabric WT_5: transfering large workshops from the area and attracting investment to create new economic centers compatible with the neighborhood in order to repair fabric	ST_1: utilizing the sense of participation in line with positive role in regulating fabric ST_2: The use of open spaces around Imamzadeh Hasan for planning and organizing the tourists to avoid traffic congestion ST_3: the project of establishing train station for emergency plan in the event of a crisis in the neighborhood in order to bring relief to people ST_4: taking advantage of local and regional markets in order to create the appropriate infrastructure and increase neighborhood safety ST_5: raising awareness about civic participation by NGOs and religious and counseling sessions

of the neighborhood fabric by widening roads to serve in critical condition is the most important strategy in the current situation than can solve many problems and threats Imamzadeh Hassan worn fabric faces. WT_3 strategy also suggests that the number of decision-making centers in worn out region in order to implement programs related to retrofitting buildings against earthquakes is of great importance. SO_1 strategy that is based on the strengths and opportunities represents the importance of creating spaces for the presence of people and enhancing the economic uses of the neighborhood in order to affect the fabric. It is thus emphasized that improving the economic functions of the neighborhood allows broader participation and financial support for neighborhood renovation and improvement efforts. WT_5 strategy focuses on transferring large workshops from the area and attracting investment to create new economic centers compatible with the neighborhood for renovation. WO_2 strategy focuses on the use of railroad space to create proper green and open spaces and this space in addition to the various functions, can be used in times of crisis. In essence, these five strategies that have priority focus on the following:
• Implementation of modernization and improvement programs, paying particular attention to crisis

Table 5. QSPM. Source: authors.

| SO$_5$		SO$_4$		SO$_3$		SO$_2$		SO$_1$			Strategy
Total appeal score	Appeal score	Total appeal score	Appeal score	Total appeal score	Appeal score	Total appeal score	Appeal score	Total appeal score	Appeal score	Coefficient	Factors
0.2	4	0.05	1	0.05	1	0	0	0.05	1	0.05	S$_1$
0.12	2	0.18	3	0	0	0	0	0	0	0.06	S$_2$
0.08	2	0.04	1	0.04	1	0.04	1	0.12	3	0.04	S$_3$
0	0	0	0	0.21	3	0.14	2	0.14	2	0.07	S$_4$
0.21	3	0.04	1	0.08	2	0.04	1	0.16	4	0.04	S$_5$
0.05	1	0	0	0.2	4	0.1	2	0.1	2	0.05	S$_6$
0.05	1	0.2	4	0	0	0	0	0.05	1	0.05	S$_7$
0.06	2	0.06	2	0.12	4	0.06	2	0.03	1	0.03	S$_8$
0.04	1	0.04	1	0	0	0	0	0	0	0.04	S$_9$
0	0	0	0	0	0	0	0	0	0	0.06	S$_{10}$
0.1	2	0.1	2	0.05	1	0.05	1	0.2	4	0.05	O$_1$
0.06	1	0	0	0.18	3	0.18	3	0.18	3	0.06	O$_2$
0.05	1	0.2	4	0	0	0	0	0.05	1	0.05	O$_3$
0	0	0.04	1	0.04	1	0.04	1	0.12	3	0.04	O$_4$
0	0	0	0	0.12	3	0.2	4	0.05	1	0.05	O$_5$
0.16	4	0.12	3	0	0	0	0	0.04	1	0.04	O$_6$
0.08	2	0	0	0.04	1	0.04	1	0.16	4	0.04	O$_7$
0.07	1	0.07	1	0.14	2	0.28	4	0.14	2	0.07	O$_8$
0.2	4	0.12	2	0.06	1	0.06	1	0.18	3	0.06	O$_9$
0.09	3	0.06	2	0	0	0	0	0.09	3	0.03	O$_{10}$
1.62		1.32		1.33		1.23		1.86			Total

management

• Creating a central organization to adjust programs related to the worn fabric

• Paving the way for increased economic activities in

the neighborhood

• Making platform for investment in the modernization of district

• Increasing green and open spaces

Table 6. QSPM. Source: authors.

| WO$_5$ | | WO$_4$ | | WO$_3$ | | WO$_2$ | | WO$_1$ | | | Strategy |
Total appeal score	Appeal score	Total appeal score	Appeal score	Total appeal score	Appeal score	Total appeal score	Appeal score	Total appeal score	Appeal score	Coefficient	Factors
0	0	0	0	0	0	0.12	3	0.08	2	0.04	W$_1$
0.07	1	0	0	0.07	1	0.14	2	0.14	2	0.07	W$_2$
0.07	1	0	0	0.07	1	0.07	1	0.07	1	0.07	W$_3$
0.15	3	0	0	0.1	2	0	0	0.05	1	0.05	W$_4$
0.18	3	0.06	1	0.24	4	0	0	0	0	0.06	W$_5$
0.05	1	0.05	1	0	0	0.2	4	0.05	1	0.05	W$_6$
0.05	1	0.04	1	0.04	1	0.12	3	0.16	4	0.04	W$_7$
0	0	0	0	0.12	2	0	0	0	0	0.06	W$_8$
0	0	0.12	4	0.03	1	0.03	1	0	0	0.03	W$_9$
0.04	1	0.04	1	0	0	0.08	2	0.08	2	0.04	W$_{10}$
0.05	1	0.2	4	0	0	0.1	2	0.05	1	0.05	O$_1$
0.18	3	0.06	1	0.24	4	0.06	1	0.06	1	0.06	O$_2$
0	0	0.15	3	0	0	0.2	4	0.05	1	0.05	O$_3$
0	0	0.16	4	0.04	1	0	0	0	0	0.04	O$_4$
0.2	4	0.05	1	0.1	2	0.05	1	0	0	0.05	O$_5$
0	0	0	0	0	0	0.12	3	0.08	2	0.04	O$_6$
0.04	1	0.16	4	0.04	1	0.04	1	0	0	0.04	O$_7$
0.28	4	0.07	1	0.28	4	0.07	1	0.14	2	0.07	O$_8$
0.06	1	0.06	1	0.12	2	0.18	3	0.18	3	0.06	O$_9$
0	0	0.06	2	0.03	1	0.12	4	0.12	4	0.03	O$_{10}$
1.42		1.28		1.52		1.70		1.31			Total
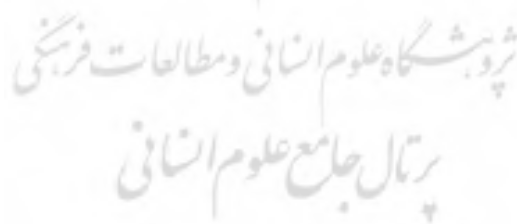
Conclusions

In improvement and modernization of worn out fabrics, special attention should be paid to the type of worn fabric. In particular, because these fabrics are vulnerable to earthquake issues, their problems should be made clear up to consider proper plans for them in a short time. Imamzadeh Hassan located in Region 17 of Tehran Municipality, Tehran is one of the old neighborhoods where old fabrics have the large area of the neighborhood and the neighborhood, and most of the residential units here are between 120 to 80 square meters, which represents fine fabric of the neighborhood. In this study, it was tried to analyze problems in the study area, and after identifying the strengths, weaknesses, opportunities and threats finally provide guidelines for organizing Imamzadeh Hassan worn fabric, and the strategies to reduce vulnerability to earthquake through spatial-physical instability search. According to the data analysis, the proper strategy for organizing worn out fabric

Table 7. QSPM. Source: authors.

| ST5 | | ST4 | | ST3 | | ST2 | | ST1 | | | Strategy |
Total appeal score	Appeal score	Total appeal score	Appeal score	Total appeal score	Appeal score	Total appeal score	Appeal score	Total appeal score	Appeal score	Coefficient	Factors
0	0	0.05	1	0.1	2	0.2	4	0	0	0.05	S_1
0	0	0.12	2	0.18	3	0.06	1	0	0	0.06	S_2
0	0	0.16	4	0.04	1	0.04	1	0.04	1	0.04	S_3
0.07	1	0	0	0	0	0	0	0.21	3	0.07	S_4
0.12	3	0.12	3	0.04	1	0.12	3	0.04	1	0.04	S_5
0	0	0.05	1	0	0	0.05	1	0.15	3	0.05	S_6
0.2	4	0.05	1	0.2	4	0.05	1	0	0	0.05	S_7
0	0	0.06	2	0.03	1	0.06	2	0.12	4	0.03	S_8
0	0	0	0	0.08	2	0	0	0	0	0.04	S_9
0	0	0	0	0.06	1	0	0	0	0	0.06	S_{10}
0.21	3	0.07	1	0.21	3	0	0	0	0	0.07	T_1
0	0	0.1	2	0.05	1	0.15	3	0.05	1	0.05	T_2
0.2	4	0	0	0.05	1	0	0	0	0	0.05	T_3
0	0	0.08	2	0	0	0.04	1	0.04	1	0.04	T_4
0.24	4	0.12	2	0	0	0.12	2	0.24	4	0.06	T_5
0.16	4	0.04	1	0.04	1	0.08	2	0.08	2	0.04	T_6
0	0	0.12	3	0.08	2	0.16	4	0	0	0.04	T_7
0.07	1	0.14	2	0.28	4	0.21	3	0	0	0.07	T_8
0	0	0.04	1	0	0	0	0	0	0	0.04	T_9
0	0	0.15	3	0.1	2	0.05	1	0.05	1	0.05	T_{10}
1.27		1.47		1.54		1.39		1.02			Total

against earthquake was chosen as a defensive strategy. This means that the weaknesses in the fabric should reduce and threats be avoided. In terms of strengths S_4 (high sense of belonging to the neighborhood because of long residence history) is the most important strength point. In Weaknesses group, W_2 (lack of open spaces between the blocks and intensive residential use and a lack of green and open spaces and lack of parking) is the most important disadvantage. In opportunity group, O_8 (that is financial support through religious beliefs (endowment, charitable, loan)) is the most important opportunity and in threats, W_5 (ignoring the role of public in participation and decision-making) is the most important weakness.

To objectively analyze the prior elements of the first phase of analysis and comparing the results of internal and external factors in the second stage for a variety of possible strategies, Quantitative Strategic Planning Matrix (QSPM) was used and the end result of this matrix, three strategies of defensive strategies (WT_1, the

Table 8. QSPM. Source: authors.

| WT$_5$ | | WT$_4$ | | WT$_3$ | | WT$_2$ | | WT$_1$ | | | Strategy |
Total appeal score	Appeal score	Total appeal score	Appeal score	Total appeal score	Appeal score	Total appeal score	Appeal score	Total appeal score	Appeal score	Coefficient	Factors
0.16	4	0.04	1	0	0	0	0	0	0	0.04	W$_1$
0.07	1	0.14	2	0.07	1	0.07	1	0.21	3	0.07	W$_2$
0.14	2	0.14	2	0.21	3	0.07	1	0.14	2	0.07	W$_3$
0.05	1	0.1	2	0.05	1	0	0	0.1	2	0.05	W$_4$
0.12	2	0.06	1	0.24	4	0.06	1	0.24	4	0.06	W$_5$
0.15	3	0.1	2	0.05	1	0.05	1	0.1	2	0.05	W$_6$
0.04	1	0.12	3	0.04	1	0	0	0.04	1	0.04	W$_7$
0	0	0	0	0.24	4	0	0	0.18	3	0.06	W$_8$
0.09	3	0	0	0	0	0.12	4	0	0	0.03	W$_9$
0.04	1	0.08	2	0.04	1	0.04	1	0.04	1	0.04	W$_{10}$
0.07	1	0.07	1	0.21	3	0.07	1	0.21	3	0.07	T$_1$
0.15	3	0.1	2	0.05	1	0.1	2	0	0	0.05	T$_2$
0	0	0.05	1	0	0	0	0	0.05	1	0.05	T$_3$
0	0	0	0	0	0	0.16	4	0	0	0.04	T$_4$
0.18	3	0.12	2	0.18	3	0.24	4	0.24	4	0.06	T$_5$
0.16	4	0.08	2	0.16	4	0.16	4	0.12	3	0.04	T$_6$
0	0	0.12	3	0	0	0	0	0.016	4	0.04	T$_7$
0.07	1	0.21	3	0.28	4	0.07	1	0.28	4	0.07	T$_8$
0.12	3	0.08	2	0.04	1	0	0	0.04	1	0.04	T$_9$
0.1	2	0.05	1	0.15	3	0.05	1	0.1	2	0.05	T$_{10}$
1.71		1.66		2.01		1.26		2.11			Total

implementation of reconstruction and renovation of the neighborhood in terms of widening the passages to serve in critical condition, WT$_3$, reducing the number of decision-making centers in worn out areas related to the implementation of resisting of buildings against earthquake and WT$_5$, transferring large workshops from the area and attracting investment to create new economic centers compatible with the neighborhood for renovation), an invasive strategy (SO$_1$, creating spaces for the participation of local people and increasing economic functions in order to affect the fabric) and a revision strategy (WO$_2$, using railroad space to create suitable green and open spaces) were selected as the highest priority strategies. Defensive strategies show that short-term modernization and rehabilitation programs should be further to reduce vulnerability to earthquake. Moreover, aggressive and revision strategies show that the strength of that neighborhood and the opportunities that lie ahead such as regional and trans-regional service, commercial and transfer functioning of the neighborhood, the use of open spaces and organizing them can largely prevent the seismic vulnerability of worn out fabrics of the neighborhood.

Reference list

• Ameri Siahoui, H. R. and Taghavi Goudarzi, S. and Beyranvandzadeh, M. (2011). Analysis approach to fabric urban poor, old fabric of Bandar Abbas. *Journal of Logistics Environment*, (12): 15-46

• Abdullahi, M. (2001). *Crisis management in urban areas*. Tehran: Printing, publishing organizations, municipalities.

• Azizi, M. (2003). *Urban density, printing, publishing*. Tehran: University of Tehran.

• Boroumand, M., Amini, E. (2012). Examining the role of the urban fabric in reducing the physical damage caused by the earthquake in the town of West and Darakeh (Region 2 in Tehran). *Journal of Logistics Environment*, (17): 111-130.

• Esmaeilzadeh, H. Khavarian Garmsir, A. R. and Kanooni, R. (2014). In light of the macro-environmental factors in urban tourism using quantitative and qualitative methods (case study: the development of tourism Yazd). *Urban tourism Quarterly,* 1 (1): 17-33.

• Faraji, A. and Gharakhlou, M. (2009). Earthquakes and civil crisis management (case study: the city of Babylon). *Geography*, (25): 146-164.

• Falah A., et al. (2013). Vulnerability assessment historical towns seismic using Analytical Hierarchy Process (AHP) and Geographic Information System (GIS) study Murray: Fahadanzone. *Journal of Disaster Management*, 2 (3): 5-13.

• Harrison, J. and Caron, J. (2004). *Strategic management*. Translated to Persian by Ghasemi, B. Tehran: Heiat.

• The Ministry of Housing and Urban Development. (2007). *The main provisions of the Master Plan of Tehran*. Tehran City Planning Center.

• Heikkala, S. G. (1982). Urban Scale Vulnerability. *Proceedings of the U.S-Italy Colloquium on urban design and earthquake hazard mitigatio*n. University of Washington and university of Rome.

• JICA and CEST. (2000). *The study on microzoning of the Great Tehran area*. Tehran: Tehran municipality.

• Jones, B, G. (1982). Planning for the reconstruction of earthquake stricken communities. *Proceedings of the P.R.C of U.S.A. Joint workshop architecture, Urban planning and engineers.*

• Majedi, H. (2010). Urban development today, the future of worn fabric. *Hoviat- e shahr*, (6): 87-94.

• Monzavi, M., et al. (2010). The vulnerability of worn out fabrics of the central part of Tehran against earthquakes: District 12 of Tehran. *Human Geography Research*, 42 (73): 1-18.

• Nastaran, M. and Houshmandfar, S. (2010). Strategic planning to organize some of the old fabric in Urmia. *Journal of Geography and Environmental Studies*, (3): 61-72.

• Müller, B. and Bentivegna, V. (2006). *Large Urban Distressed Areas: a difficult challenge for European cities,* LUDA PROJECT; Project coordinated by Institute of Ecological and Regional Development, Dresden.

• Nakabayashi, I. (1994). Urban Planning Based on Disaster Risk Assessment. In Disaster Management in Metropolitan Area for the 21st Century. *Proceedings of the IDNDR Aichi/Nagoya Intrnational Conference,* 1-4, November, Nagoya, Japan.

• Nasiri, I. (2013). Analysis of the spatial instability-Space Urban Distressed Areas Case Study: Region 10 of Tehran. *Modiriat- e shahri Journal*, 11 (31): 269-280.

• Pourahmad, A., et al. (2013). Priority of assessment of cultural tourism development strategies in the region of Alamut. *Human Geography Research*, 45 (3): 1-17.

• Teimuri, P., Rahmani, B and Iraqi, S. (2010). Malayer worn out fabric and ways of organizing it. *Manipulating geographic Journal*, (8): 117-134.

• Hataminejad, H., Fathi, H and Eshgabadi, F. (2009). Evaluation of seismic vulnerability of urban sample: District 10 of Tehran. *Human Geography Research*, 42 (68): 1-20.

• Rahnama, A. and Talei, M. (2011). Reconstruction of earthquake to help prioritize Tehran urban areas fuzzy model and GIS. *Journal of Logistics Environment*, (16): 51-71

• Rezazadeh, R. and Mohammadi, F and Rafieian, M. (2013). The role of asset-based approach to local sustainable development (Case Study: Imamzadeh Hassan Neighborhood). *Bagh- e nazar,* (25): 39-48.

• Razavian, M.T., Mohammadi, K. and Abobakri, T. (2013). *Urban Distressed spaces* (program improvement and modernization). first edition. Mashhad: The International University of Imam Reza (PBUH).

• Sajadi, G. Pourmusa, S. M. and Eskandarpour, M. (2011). Upgrading and modernization of old urban fabric with an emphasis on public participation (Case Study: Tehran Dolab neighborhood). *Journal of Logistics Environment*, (14): 143-164.

• Shams, M., et al. (2011). Search for earthquake disaster management in the context of the old city of Kermanshah; Case Study: Faizabad district. *Amayesh- e mohit*, (13): 41-66.

• UNDP. (2004). *Reducing Disaster Risk: A Challenge for Development.* A Global report, New York, NY 10017. New York: Breau for Crisis Prevention and Revovery.

• Ye. Y. (1984). Urban earthquake disaster mitigation through architectural design and urban planning. *Proceedings of the proceeding of the of the eighth of the eighth world conference on earthouake engineering,* San Francisco, California.

• Zangi Abadi, A. Sani, R. and Varethi, R. (2009). Statistical analysis of seismic risk zones 11 and 12 in Tehran. *Journal of Humanities lecturer*, 13 (3): 91-111

• Ziyari, K. Muhammadi Dah Cheshmeh, M. and Pourahmad, A. and Ghalibaf, M. B. (2012). Metropolitan Branch priority to secure the old fabric using multi-criteria evaluation model. *Human Geography Research*, 44 (1): 1-14.