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Locating Urban Catalyst Projects in Inefficient Urban Textures with the Regeneration Approach: A Case Study on Tehran[*]

Mohammad Saeed Izadi[1], Mehrdad Karimi Moshaver[2],

Hasan Sajjadzadeh[3], Mohsen Tavassoli*[4]

Abstract

Considering inefficient and old textures and also resolving their instabilities, urban regeneration has become a serious and pivotal subject, in a way that has directed the related organizations to organize and recreate textures and brought up the necessity of intervention. Regarding the regeneration, formation of inefficient urban textures and formation of development stimulus can be a suitable approach for this aim. In these regards, distinguishing utilized zones for implementing development stimulus can be a suitable way to improve the conditions of inefficient textures. The aim of present study with analytic-descriptive approach, is to use 13 social and physical criteria in AHP model framework and perform zoning of area number one in region eighteen in Tehran for locating urban renovating projects. The results of accomplished in the framework of studied case, demonstrates that 2.17 hectare (14.8 percent) of the lands in old texture, show the least amount of capabilities for regeneration (northern parts of area 1 in region 18 in Tehran) and in opposite, 1.13 hectare (7.7 percent) of the studied area, have the most capability for implementing regeneration projects (northern part of Ferdows neighborhood).

Keywords: Urban inefficient and old texture, Development stimulus projects, Urban regeneration, Tehran, AHP model.

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[1] Assistant Professor, Department of Architecture, University of Bu-Ali Sina, Hamadan, Iran. E-mail: ms.izadi@basu.ac.ir

[2] Assistant Professor, Department of Architecture, University of Bu-Ali Sina, Hamadan, Iran. E-mail: mkmoshaver@yahoo.com

[3] Assistant Professor, Department of Urbanism, University of Bu-Ali Sina, Hamadan, Iran. E-mail: sajjadzadeh@basu.ac.ir

[4] Corresponding author. Ph.D. Student, Department of Urbanism- design planning, University of Bu-Ali Sina, Hamadan, Iran. E-mail: tavassoli1377@gmail.com

1. Introduction

In recent decades, the rapid growth in urbanization, development and expansion of cities have brought up some dilemmas, challenges and complexity. One of the consequences of this phenomenon, is the rapid change in physical and socio-economic texture of city centers. This change has caused decrease in social dignity, disorganization in physical-spatial organization, economic degeneration, and functional inefficiency. City administrators show great efforts in elimination of these problems and rehabilitation of destructions and degeneration of urban textures (Bahreini et al, 2013: 18). One of the most important approaches which has been used in urbanization changes and renewal of degenerative textures, in recent decades of twentieth century, is urban regeneration (Ibid: 19).

Nowadays, the term "urban regeneration" is used as a general term which includes other concepts like improvement, rehabilitation, reconstruction, and empowerment. Urban regeneration is a process which results in creation of a new urban space by keeping the main spatial spaces (physical and functional). In this movement, a new urban space is created which by keeping the fundamental features of the old urban space, demonstrates semantic and substantial features with the old spaces (Habibi, 2007: 5). Regeneration means creation of a new spatial organization, applicable to new situation and features which all influence the creation of new urban relationship or renewed definition of the old or available urban relationships (McDonald et al., 2009: 50).

Urban regeneration is a comprehensive policy including qualitative improvement of urban textures with incorporated economic, social and cultural aims which does not only focus on physical changes, but emphasizes at social changes. Urban regeneration refers to both attractions of urban spaces through rehabilitation of available element and creation of new physical elements, and integration of different official and defined activities with unofficial activities (Sajadzadeh & Lotfi, 2015:148-149).

According to the conditions ruling over central textures and old textures, the issue of regeneration and the results which are expected from implementation of these plans can be formed in these areas. Growing trend of urbanization along with rapid physical and unnatural urban accommodations and also the expansion of disproportionate urban constructions have caused more loss to old textures, lack of identity of city and negative influence on urban citizens (Kiani et al, 2009: 121).

Despite the value and unique situation of old textures in spatial and practical structure of the city and potentials and strength points of them, some problems and boundaries like physical limitation, traffic problems, availability of abandoned and unprotected spaces, lack of suitable public spaces and etc, have caused reduction in the value and importance of old texture and identity of cities. Also, financial capabilities increase migration problems (Pourahmad et al, 2010: 74). In this regard, adopting the regeneration policy in the field of old urban textures, according to investigating strength and weak points, can be an appropriate way to return to these valuable textures to the cities.

2. Literature review

Since 1970s, "urban regeneration" has been in concern as one of the main policies of Western Europe and North America in facing problems and challenges of urban regions. Since then, urban regeneration has become a turning point of many urban planning guidelines to encourage private sector stakeholders towards regeneration of degenerative neighborhoods (Karimi, 2015: 46). For instance, Pope Sixtus V foot scale has been reconstructed as a plan of urban regeneration to attract more tourists and transform Rome to a suitable capital for Christian world (Bacon, 1997: 126). Benevelo (1980) evaluated Haussmann programs in Paris which resulted in urban reconstruction in a large scale and imposition of 95 kilometers of a new street network in the middle ages of Paris structure and destruction of 50 kilometers of old arteries of this center (Izadi & Feizi, 2012). Parkinson (1989) emphasizes on the necessity of having a broader view,

formulation of more comprehensive planning packages for resource supply, training, creating more context, investment development and social necessities (Sajadzadeh & Zolfi, 2015).

According to the results of Stöhr (1989) and Lichfield's (1992) field studies, urban regeneration is a developed approach in urban reconstruction which has reached beyond the aims, goals and achievements of large scale reconstruction of the fifties, resuscitation and improvement the seventies and reconstructions of the eighties, with the emphasis on commercial centers and accommodations (Roberts, 2000: 14). Montgomery (2003) studies the creation of good neighborhoods on the basis of cultural models to recreate declining neighborhoods of the cities. According to Blakeley & Evans (2009), social and cultural explanations should be privileged over any idea of autonomous rationality regarding participating for urban regeneration.

In addition to foreign implemented studies, some appropriate Iranian domestic studies have been done, related to urban regeneration, inside the country which are as follow. Sajadzadeh & Zolfi (2015) study considered the role of urban planning in regeneration of traditional neighborhoods with the approach of development stimulus in the area of Golpa locality in Hamedan. The results demonstrate that social concept has a greater priority in proportion to the other concepts in Golpa locality and considering social problems and issues is the main approach of development stimulus in this neighborhood. Zangi Abadi & Moaedfar (2012) in their essay with the title of "Urban Regeneration Approach in Old Textures" with the use of SWOT model studied related issue in six windfall quarter in Yazd. The result of the study demonstrates that the role of external factors in regeneration of the old texture of six windfall quarter is more than available factors in the mentioned neighborhood. By employing internal-external matrix cart, the use of concentrated guidelines is suggested in order to protect the present condition, and also have adequate attempt to improve strength points and optimum use of them, reduction of weak points and change them into strength points and a good use of opportunities and transformation of threads to opportunities. Izadi (2010) in his study, "Urban Regeneration, a comprehensive and integrated interaction and insight into organizing objective fields and urban reconstruction", studied the issue of regeneration of urban ranges which have urban problems. This research, in addition to studying the change trends in urban regeneration and preservation of available textures, analyses the aspects of urban regeneration as a general policy facing managers and urban planners' challenges. This research demonstrates that in the modern preservation approach, being holistic in concerning values and also historical environment as an economic and social wealth and a great cultural source as the pivotal principles. Pourahmad et al. (2010) have studied reformation way of concepts of urban regeneration as a new approach in urban old textures. In this research, two main directions are followed: first, explaining a path which links urban reconstruction and improvement to urban regeneration and regeneration, and transforms it to a holistic and contemporary intervention approach. Second, deals with the concept of urban regeneration explanation of principles, strategies and processes. Lotfi & Zargari Marandi (2010) studied urban regeneration and redefinition of exhaustion criteria: A beginning for stable urban restoration.

3. Theoretical principles

a)   Urban Regeneration

In the late literature of the world, urban regeneration is a process which results in the creation of new urban spaces with preservation of main spatial features (physical and activity based). In this measure, a new urban space is created which in addition to the main similarities with the old urban spaces, demonstrates connotative and substantial differences with the old spaces (Habibi & Maghsoodi, 2007: 27). In a general sense, regeneration tries to renew the life of places which have become worn out through the time and do not have the necessary efficiency through investigating the condition, environmental, social, cultural and

economic situations. In a way that, if practical and physical resuscitations take place all together, improved environmental qualities will be more.

b)   Approaches with the concept of urban regeneration

✓   Regeneration through reservation

✓   Regeneration based on social groups

✓   Regeneration based on integrated cultural, artistic, and athletic usages

In the present era, there is a growing understanding of art, culture and leisure time has become an important part of urban regeneration policy. Using development stimuli, especially implementation of cultural and artistic projects, triggering cinematic, literary festivals, management of sport events, leading tourism industry and concerning programs related to spending leisure time, are the main pivotal programs for urban regeneration (Izadi, 2010).

c)   Aspects and features of urban development stimuli

Urban stimuli can be of tangible and distinguishable elements like hotel, commercial center, public transportation stations, museums, urban open-spaces and even a fountain or in a less tangible fields like a historical event, political actions in urban development, injection of a special operation and a set of planning instructions (Attoe & Logan, 1989: 46). In addition, urban stimuli can be temporary elements like holding traditional and domestic events and ceremonies which are held annually or monthly. Attoe & Logan by evaluating many of urban resuscitation projects in urban centers of America, consider eight features for an urban catalyst:

✓   A new element or action will change its surrounding elements.

✓   The quality of surrounding elements will change and improve in a positive way.

✓   A created catalytic reaction doesn't make any harm to its surrounding texture.

✓   Creating a positive catalytic reaction needs a comprehensive understanding of the background.

✓   All the catalytic reactions are not the same.

✓   The final product of response will be more suitable than sum of primitive parts.

✓   The primitive stimulus element or action will remain distinguishable (Karimi, 2015: 26).

d)   Regeneration with development stimulus approach

In the last years, especially from late nineties, policy makers and urban planners have been seeking to present modern strategies and solutions for problems of urban central places and other unorganized fields. A downfall in social and economic dignity and practical and physical disruptions in these fields, along with a severe disruption in the quality of urban environment, has reduplicated the necessity to be concerned about these areas (Taheri & Taghvaei, 2012: 84)

One of the modern policies in urban development in general, and specially in regeneration of urban disruptive textures, is the use of development stimulus activities and projects which aim at accelerating and facilitating development process in these textures, utilizing social cooperation and ability of the citizens and use of local capacities. In fact, urban stimulus, are modern strategies of redevelopment in the form of projects and include landscapes or structures that will follow urban development and increase in the users
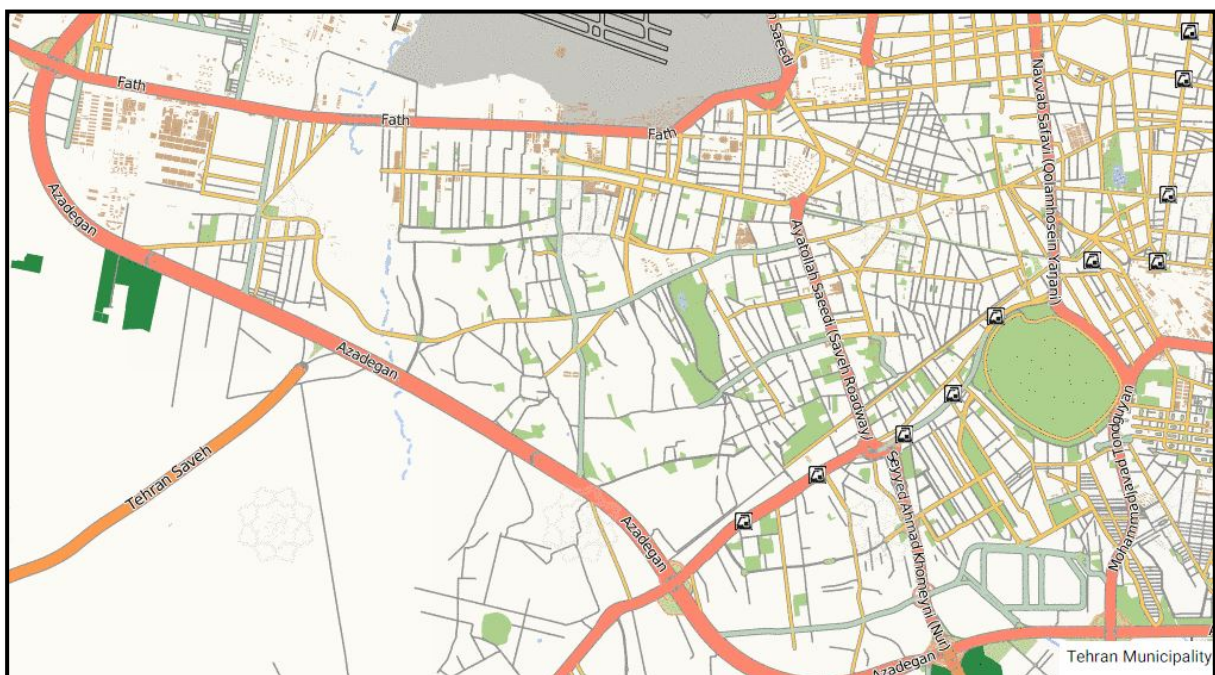
in one area. Development stimuli are some projects which follow resuscitation of urban texture (Bohannon, 2004: 10).

Development stimulus and urban regeneration have a variety of types and measures. On the whole, stimulus activity in target textures of actions of improvement and renovation can be categorized in four categories:

1.   Improvement and development of infrastructures, transit network and equipping and development of public places.

2.   Development and providing local, urban services

3.   Modeling

4.   Resuscitation of urban historical spaces and collections

3.1. Case study

Region 18 of Tehran is one of the urban regions in this city which is located in north and includes seven urban areas. Area 1 of region 18 of Tehran municipality is located in the East. According to the last estimation, the population of this area was 107,714 and the amount of households was 32,812. Extend of the area was 437.92 hectares which 11.55 percent of the area in general and by considering the privacy of the area, includes 0.26 percent. Area one is limited from the North to South interval of 45 meter of Karaj old road, from south to the south interval of Baradaran Bahrami (Yaran) Street, from East to Bahar 45 meter Boulevard and Martyr Students Street and from West to East interval of Ayatollah Saeidi Highway (detailed plan of region 18, Tehran, 2014).

Map 1: Location of old textures of region 18, Tehran

According to reviews, the old textures of area 1, region 18 in Tehran, includes 14.6 hectares of area 1 which is about 14 percent of old texture in region 18. For choosing the range under study, it should be mentioned that availability of old texture in this area, and lack of social and physical mobility of old texture in area one, have increased the exhaustion of available texture. In this regard, it is necessary to have a kind of policy to

improve the present condition through making spatial and physical changes. It should be mentioned that for the lack of public places and services in the old texture under study, and on the other hand, availability of barren and unusable lands in it, it has become possible to form development stimulus projects and ultimately will lead to regeneration of the city in the areas of old texture under study.

4. Materials and methods

In this study, by examining the current literature and conducting a filed research, given data were used to produce:

−   Utilization of Global Mapper software to determine the position of influential usages in locating development stimulus in old textures (parking location, relief services, …)

−   Utilization of comprehensive plan of Tehran region 18 to produce maps (land usage, open spaces and vacant lands, physical features of the building (materials, quality and the age of the building, etc.)

After producing demanding maps (in line with the related subject), all the produced maps in ARC GIS are gathered and saved, and then after weighing through AHP, are overlaid. Then the appropriate map for old texture is determined for formation of usages which have the capability of creating urban mobility and regeneration of old texture. This map will be analyzed according to available capabilities in the studied case.

4.1. Analytic hierarchy process (AHP)

Analytic hierarchy process (AHP) is a logical framework which makes understanding and analysis of complicated decision making easier through changing them into hierarchical structures (Al-Shalabi et al., 2006). AHP process was used by Thomas L. Saaty for the first time. This method is a model for decision making and selecting the best options, especially when there are several criteria and milestones for decision making (Saaty, 1980). Today, analytic hierarchy process (AHP) is used for local planning, locating and prioritizing. By utilizing several qualitative and quantitative criteria and based on the way of arrangement, some categories are arranged to reach the goal of arrangement. For the present issue, it should be said that locating stimulus development in old urban textures is related to some factors including physical factors, population, urban infrastructures and also the condition of different urban utilization which can be used to establish development stimulus projects. In this regard, utilizing AHP model which has the capability of analysis and integrating all the physical, social, infrastructural and economic factors, can help comprehensive evaluating of development stimulus projects and lead to optimum locating of these projects in old urban textures.

4.2. Aligning and establishment of preferences through paired comparison

This level is the second step in analytic hierarchy process. In fact paired comparison is known as the principle of analytic hierarchy process (Ülengin et al., 2001: 366). In this step, each level with relation to its elements is compared to the higher level in the form of paired comparison. The comparison of the pairs are done with using weight 1 (the same preference), 5 (more preference), 7 (much more preference), 9 (totally preferred) and also middle preferences which are done using numbers (2, 4, 6, 8) (Tofigh, 1994: 24, quoted from Thomas L. Saaty).

4.3. Choosing options

In this step after producing criteria in ARC GIS, each of these criteria will be divided into five options criteria according to available standards and then will be weighed with the weights of 1, 3, 5, 7 and 9. This weights

show lack of desirability, a little desirable, strong desirability, very strong desirability and completely desirable, respectively which are temporary for locating.

4.4. Physical zoning criteria for old texture regeneration

Regarding evaluating capability of development stimulus projects with the approach of regeneration of old textures in the field studied, and according to available information of Tehran region 18, following criteria can be presented:
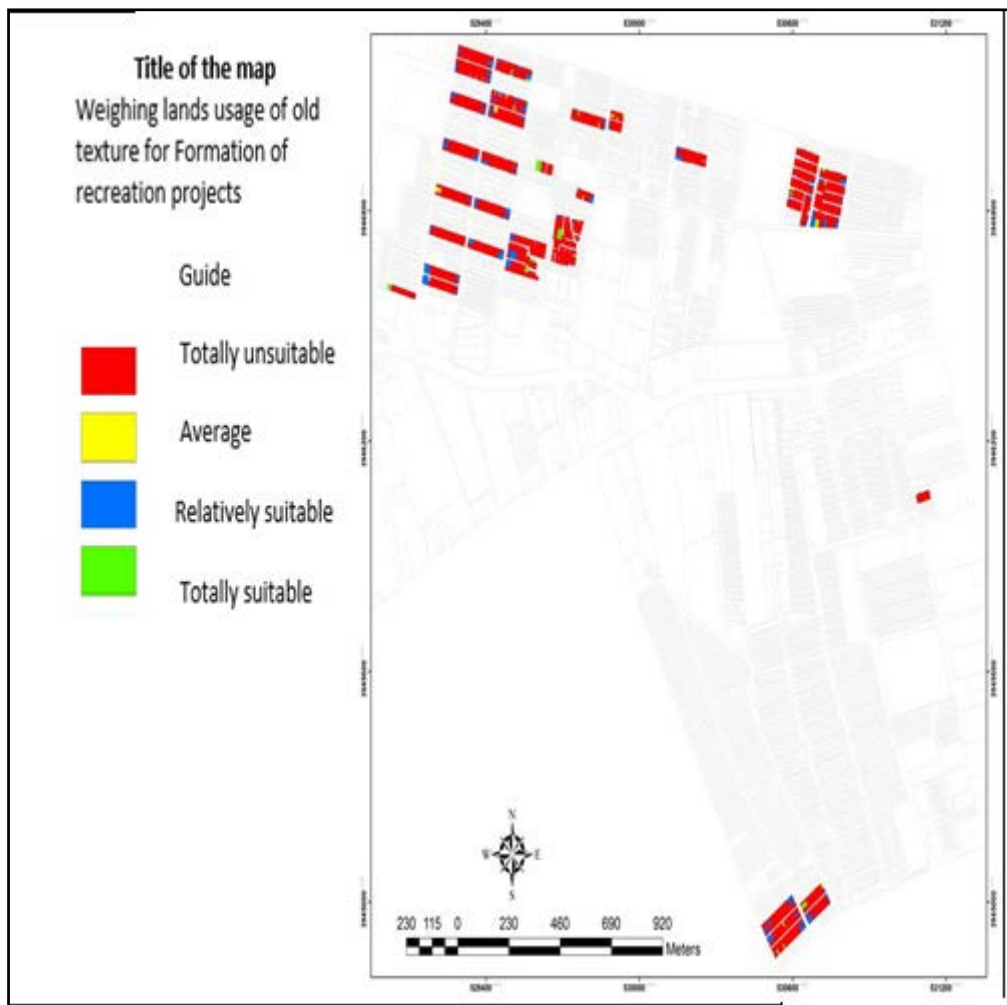
1- Land usage; 2- population density; 3- building materials; 4- structure quality; 5- construction lifetime; 6- number of floors; 7- passage width; 8- accessibility to the local parks; 9- accessibility to sport spaces; 10- accessibility to parking; 11- ownership condition; 12- level of literacy; 13- accessibility to primary education space.

Regarding utilized criteria, it should be mentioned that the physical essence of building structures and also accessibility condition which can lead to more efficiency of entrepreneurship projects, has been influential in selecting the criteria.

In the following, to get more familiar with utilized criteria and the way of their distribution, some of the criteria are discussed:
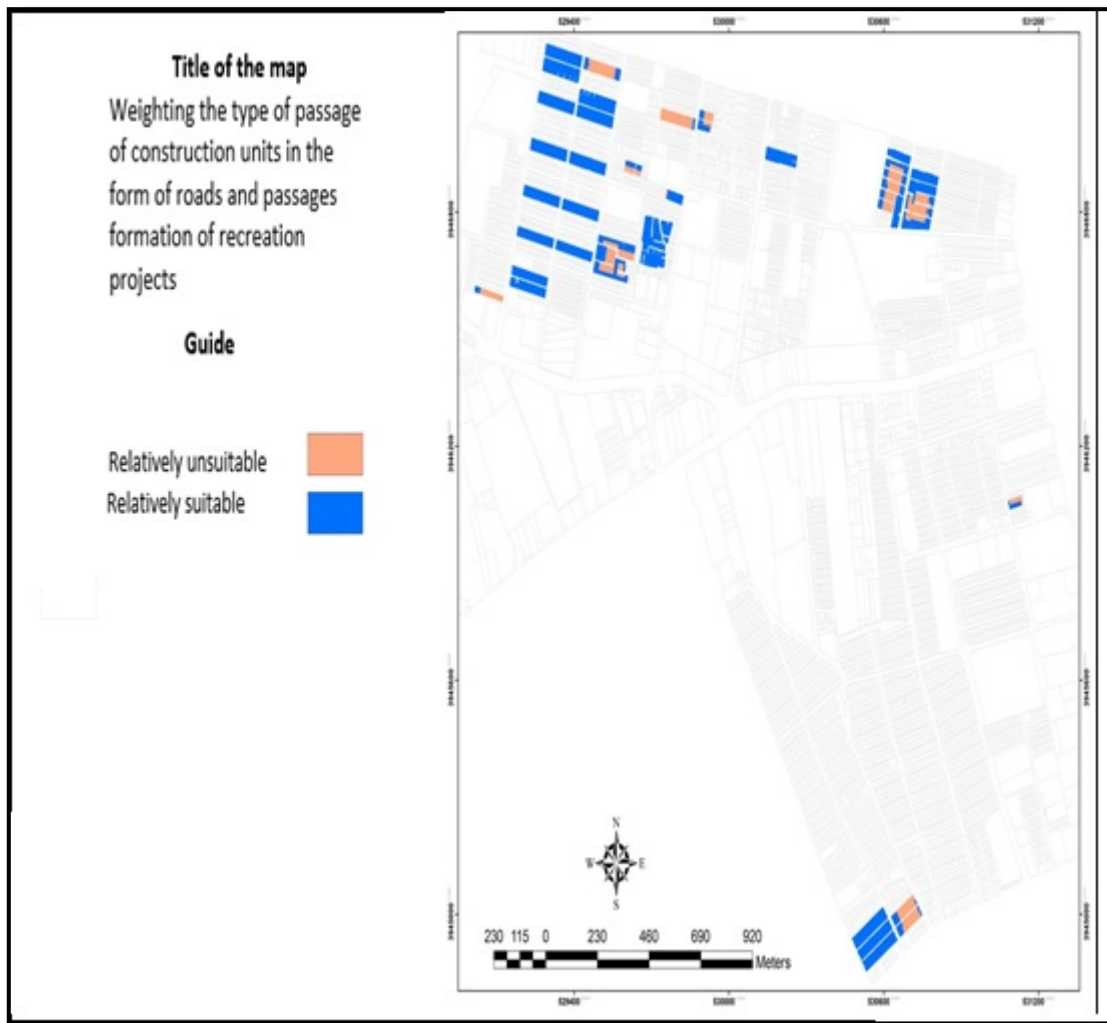
4.5. Use of urban lands

Investigating the use of available lands is necessary in evaluating any kind of locating and zoning study, because every usage does not necessarily have the possibility to present needed capability for the related projects. It means that residential usage have the least capability for formation of regeneration projects in old texture span. On the contrary, cultural, commercial, regenerational and therapeutic usages have a higher amount of capability to form regeneration projects in old textures. In this regard, land usage was weighted in proportion to regeneration projects capabilities as shown in the following demonstration:

Map 2: Weighting of land use, area 1, region 18, Tehran for regeneration projects

4.6. Passage width

Development stimulus projects, according to the type of operation they want to present, should have **a** quick and safe accessibility of the old texture residents. In this regard, it can be said that any kind of service and utility which is formed with the formation of development stimulus projects, can be transferred to the old texture and have a comprehensive development. For this, the width of passage network were evaluated and weighted (passages less than 6 meters were given relatively unsuitable weights and points and passages more than 6 meters, formed a better condition for the buildings around.
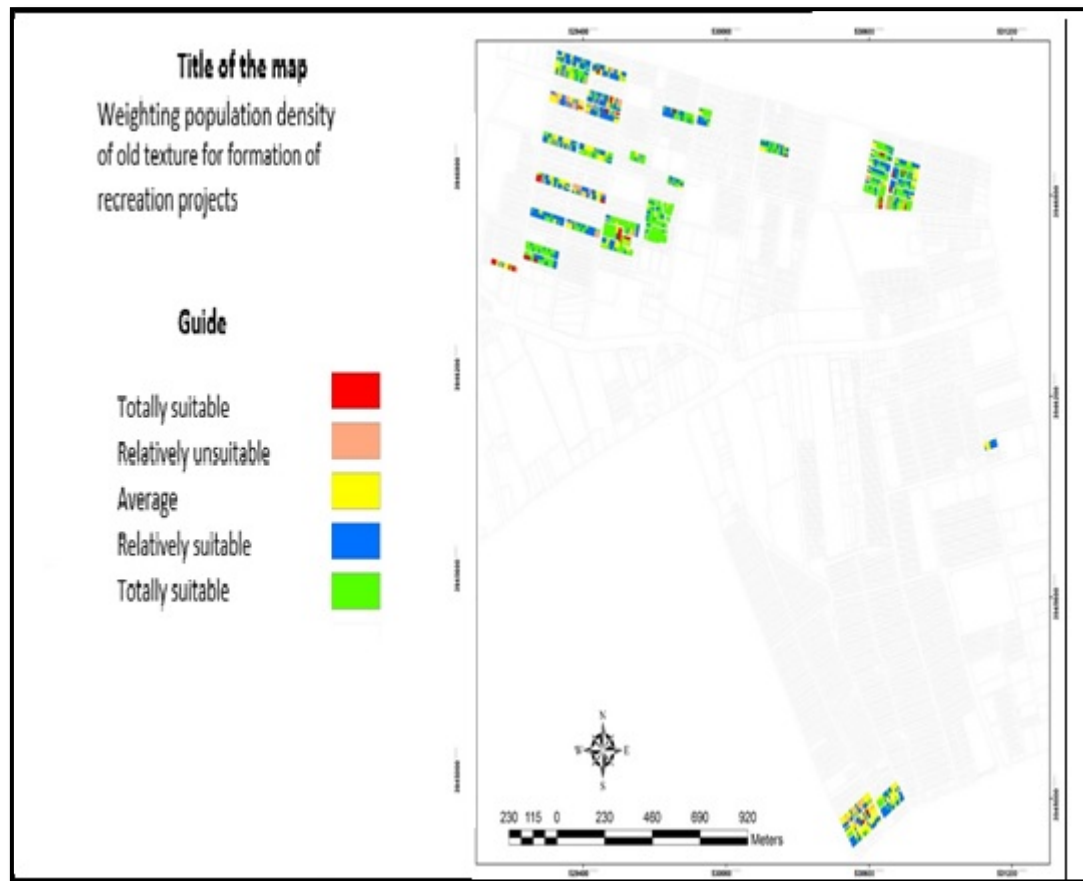
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Map 3: Weighting the type of passage of construction units of area 1, region 18, Tehran for regeneration projects

4.7. Population density

One the other important criterion is population density. In this regard, it can be mentioned that, the place of locating regeneration projects can take place in zones which does not lead to population change and population mobility. It means that low density zones, have a better condition to form regeneration projects. However, it should be considered that high density of population, around development stimulus projects, can have a better and more suitable role in prosperity of these kinds of projects.

For this reason, in the present study, zones with low density or were close to high density zones, have more points. The following illustration shows population density weighing to area 1, region 18, in Tehran:

Map 4: Weighting population density, area 1, region 18, Tehran for regeneration projects
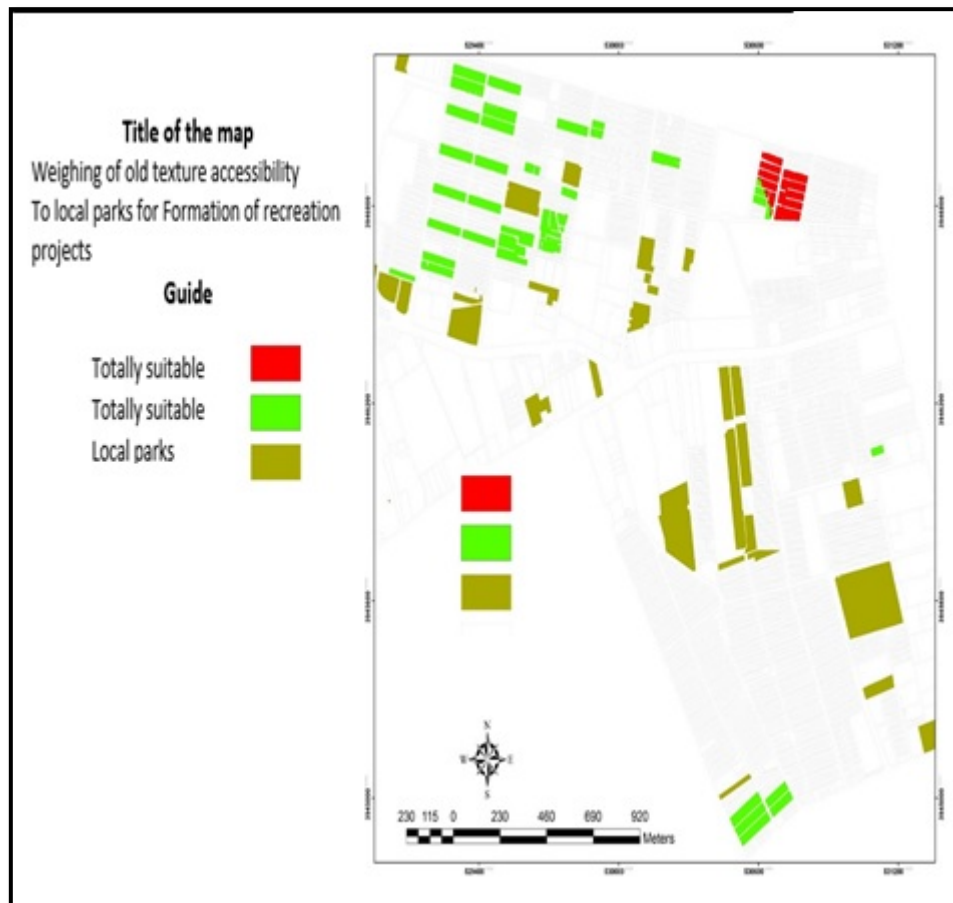
4.8. Literacy level

Literacy level of one region's residents, especially in old textures, can have a more suitable role in formation of regeneration projects, which means that, the higher the literacy rate, the higher the possibility understanding regeneration projects, and in result, possibility of provision of services and land, etc. will be more for residents. In this regard, with investigating population blocks of related old texture, the blocks with higher literacy level, were given a higher priority for regeneration project formation.

Map 5: Weighting population density, area 1, region 18, Tehran for regeneration projects

4.9. Accessibility to parks and local green spaces

Urban green spaces act as factors for social mobility and quick accessibility can allow utilized service provision. Development stimulus projects and urban regeneration plans, with suitable accessibility to green spaces, facilitate accessibility of the residents to minded projects. For this reason, in this part of study, according to suitable accessibility standard of one urban region to public green spaces and local parks (350 meter), weighing the local parks privacy was done which are shown in illustration number 6.

Map 6: Weighting of accessibility to green spaces and local parks, area 1, region 18, Tehran for regeneration projects
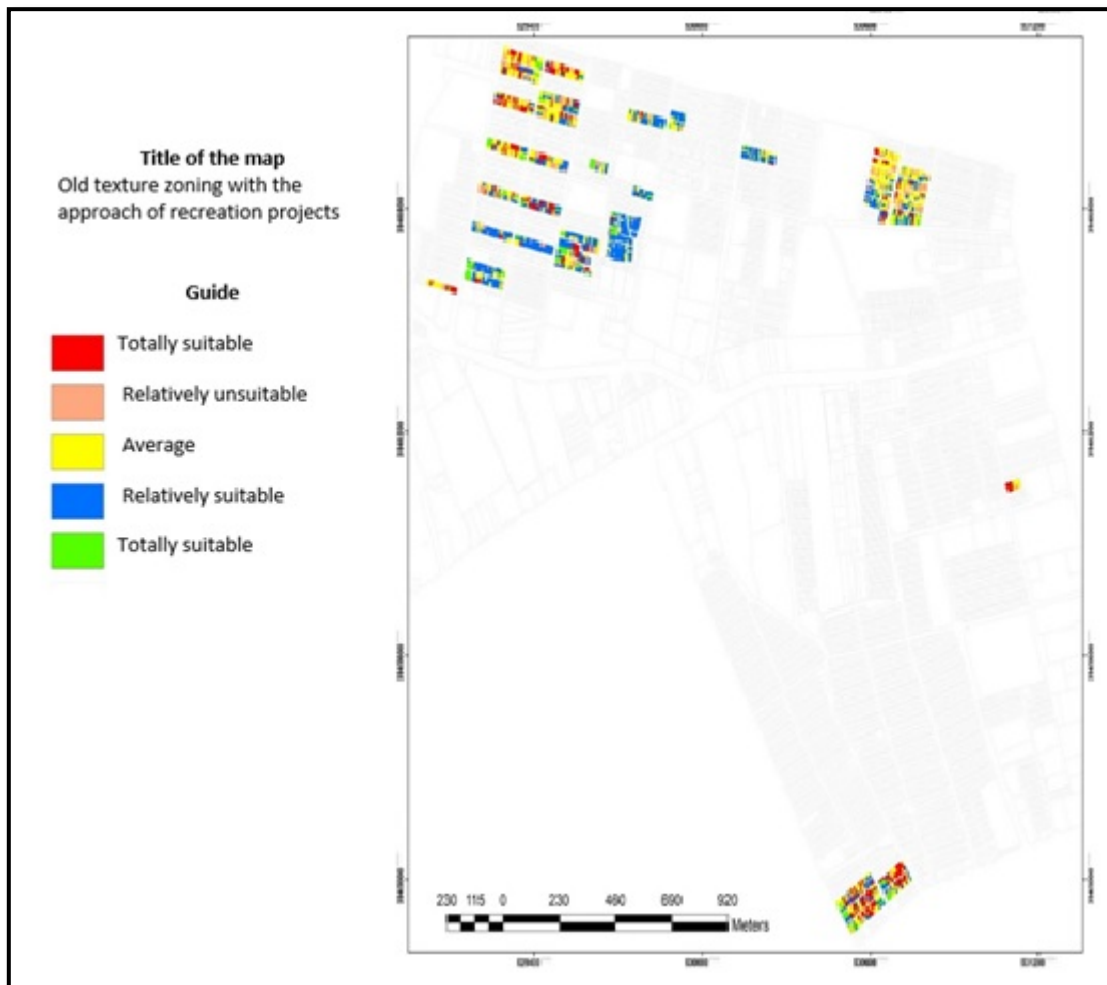
4.10. Paired comparison matrix (double)

After the formation of hierarchical structure in each decision making problem, paired comparison is used in each step of hierarchy, to determine proportionate importance of each criterion. This method includes a set of paired comparisons to make fit matrix. This matrix receives some paired comparisons as inputs and makes related weights as outputs (Malczewski, 1999; 157). Then, paired comparison matrix was formed to determine the final weight of each criterion (Table 1). It should be mentioned that compatibility coefficient or matrix agreement ratio (CR[1]=0.066) was estimated:

	Land usage	Population density	Materials	Quality of the building	Oldness of the building	Number of stories	Passage width	Accessibility to park	Accessibility to sport	Accessibility to parking	Ownership condition	Literacy level	Accessibility to education	Total weight
Land usage	1	2	3	3	5	6	7	7	8	8	9	9	9	0.2423
Population density	0.5	1	2	3	4	5	5	7	7	8	8	9	9	0.1955
Materials	0.3333	0.5	1	2	3	4	5	6	6	7	8	8	9	0.1463
Quality of the building	0.3333	0.3333	0.5	1	2	3	7	5	5	7	7	8	8	0.1116
Oldness of the building	0.2	0.25	0.3333	0.5	1	2	3	3	5	6	7	7	8	0.082
Number of stories	0.1677	0.2	0.25	0.3333	0.5	1	2	3	4	5	6	7	7	0.0631
Passage width	0.1429	0.2	0.2	0.25	0.3333	0.5	1	2	3	5	5	5	6	0.0473
Accessibility to park	0.1429	0.1429	0.1677	0.2	0.3333	0.3333	0.5	1	2	3	4	5	5	0.0347
Accessibility to sport	0.125	0.1429	0.1677	0.2	0.2	0.25	0.3333	0.5	1	2	3	3	5	0.0256
Accessibility to parking	0.125	0.125	0.1429	0.1429	0.1677	0.2	0.2	0.3333	0.5	1	2	3	4	0.0194
Ownership condition	0.1111	0.125	0.125	0.1429	0.1429	0.1677	0.2	0.25	0.3333	0.5	1	2	3	0.0149
Literacy level	0.1111	0.1111	0.125	0.125	0.1429	0.1429	0.2	0.2	0.3333	0.3333	0.5	1	2	0.0121
Accessibility to education	0.1111	0.1111	0.1111	0.125	0.125	0.1429	0.1677	0.2	0.2	0.25	0.3333	0.5	1	0.0101
Total weight														1

Table 1: Paired comparison of used criteria in zoning of regeneration of old texture

After overlaying the layers and preparation of criteria of paired matrix (it should be mentioned that in this study, overlying the layers and preparation of matrix is done with the use of AHP software which is uploaded on ARC MAP), the production of zoning map of old texture in area 1 of region 18 in Tehran for locating urban regeneration projects, based on results gotten in analytic hierarchy process (AHP) environment will be done. Illustration number 7 shows zoning of old texture lands in area 1, region 18 in Tehran for urban regeneration projects:

Map 7: Old texture zoning of studied region for regeneration projects using AHP model

The gained map based on analytic hierarchical process (AHP) shows 5 different zones of capability of physical textures in related area for the formation of regeneration projects which begins from the least capability and continues to greatest capability for the formation of urban regeneration projects in area 1, region 18 in Tehran.

The first zone shows the least amount of capability for formation of regeneration projects which is 2.17 hectare (14.8 percent) of lands of area. Major unsuitable zones for locating regeneration projects are in North part of area 1 in region 18.

For the most suitable zone (with most capability of formation of regeneration projects) it can be said that it includes 1.13 hectare (7.7 percent) of the related region and is located in central parts (South part of Ferdows Neighborhood).

Other detected zones for executive capability of urban regeneration projects in old texture of related region (relatively unsuitable, average and relatively suitable for regeneration projects) assigned 12.9 percent, 32 percent and 32.4 percent of related region.

5. Conclusion

Urban old textures, according to their special features, are increasing in urban environment day by day and over time include more physical aspects of the cities. In order to prevent growing development of urban

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old textures, there is a need for a modern approach in preparation and execution of urban development. Urban regeneration plans, according to their special features and capabilities, can be influential in realization of this aim. Formation of urban regeneration plans and projects in all physical parts of old textures cannot act in an optimum way, so the best place to form urban regeneration projects which have capability of mobility in old textures and being responsive, should be determined. In this regard, in the present study with the use of 13 physical and social criteria, effective on optimum locating of urban regeneration projects, evaluation of old texture of area 1 in region 18, in Tehran was done and optimum zones for locating urban regeneration locating in analytic hierarchical process (AHP) were detected. The results of the study, demonstrate that 2.17 hectare (14.8 percent) of the lands of old texture, have the least capability for the formation of urban regeneration projects (North of area 1, region 18) and in return, 1.13 hectare (7.7 percent) of the related region has the most amount of capability for execution of development stimulus projects (South part of Ferdows neighborhood). For the optimum detected zone for development stimulus in old textures it should be said that cultural-regenerational usages (green spaces) and commercial places around high density lands have suitable physical aspects (materials, quality and structure lifetime), have the most capability to form development stimulus projects. Also, appropriate accessibility to these areas, to surrounding barren spaces and width passage networks, will accelerate formation of regeneration projects in old textures.

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