

Spatial Analysis of The Indexes of Life Quality Using a Multi-Criteria Decision Making Approach (A Case Study of Abhar Municipal Regions)

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Abstract

Nowadays the quality of life is one of the factors that have special standing in the context of urban planning studies. This factor became significant due to the increasing importance of quality of life in the monitoring of public policy and its role as an efficient tool in the management and planning. Urban life quality is usually measured through the surveying and evaluation of subjective perception of citizen satisfaction of routine urban life and is measured using objective indicators. Nowadays, quality of life is the main goal of all programs is provided by the scientists and urban planners; therefore evaluation and spatial analysis in the quality of life indexes in urban areas and urban classified in terms of these indicators, it is essential to identify and improve the problematic areas. Due to this importance, this study analyzed the quality of life in Abhar municipal regions based on six criteria included that social, economic, housing quality, access to urban facilities and utilities, public transport and hygienic quality of environment. Research method based on quantities and analytical methods. In literature parts documentary and in field studies have been used questionnaire methods. To estimate sample size using Cochran formula and then 384 Abhar residents using a random sampling method to distribute questionnaires were chosen and multi criteria decision methods were used for rating Abhar municipal regions in terms of quality of life. One of the methods to measure the weight of a multi criteria analysis method that is involved in this research to prioritize the criteria weighted model (AHP) has been used. The results of this study show that, due to differences in the parameters and characteristics of socio-economic indexes, Abhar municipal region has differently quality of life than with other region, So that in terms of quality of life Region 2 has highest rate Region 4 had lowest rate in the ranking of Abhar municipal region.

Keywords: Quality of Life, Objective and Subjective Indicators, Multi- Criteria Decision Making, Abhar City

1. Introduction

As the living context of the human being, cities play fundamental roles in creation of a sense of satisfaction, it actually forms the human lifestyle and to specify one's quality of life. Thus, paying attention to the physical environment of the city by the urban planners and managing it plays a great role on enhancing the humans' quality of life. (Smith and Levermore, 2008). At the same time, the living environment of human beings and the feeling of belonging to the environment is way more important to the demographic and socio-economic factors on the quality of life (Nejat et al, 2007: 8). In a way, a city is the prepared and fundamental appearance of vital human life indicators in which human is reacting with his/her peripheral environments since their lives are contained in the packs of urban circumferences (Rahnamae and ShahHoseini, 2006). The hastily process of urbanization in the expanding countries have not only made the expanding possible but have also contributed to the derangement in the objective and subjective qualities of the third world cities, especially during the post-world war II by the sheer impact on the objective aspects of the expansion. Outbreak of different types of inequalities, far-reaching poverty, destruction of the natural environment, malnutrition; imbalanced expansion of the cities and other

phenomenon are only a number of the malfunctions of such actions.

On the other hand, the rapid growth of urbanization and the attention to the physical and skeletal concepts and negligence to the social goals in the development plans have affronted the cities with undesirable cycles of unbalanced socio-economical, environmental phenomena and have led to the increase in the quality of life. Now, it has been a long while since the urban planners and decision-makers have resolved to find a remedy according to the subject of urban life quality, to liberate the human race from the mentioned issues. Regardless of the concept of urban life quality in the process of urban expansion, in the city of Abhar - situated in the district of Zanjan - it was not considered due to the rapid urban growth and the urban expansion demands especially from the 2000's decade and also the theoretical weaknesses in the conduction systems and urban expansion control; the city is facing issues including defects in the quality and the quantity of the spaces and the capitation of public/ welfare services in the provincial standards, inconsideration to the environmental issues and imbalance between social welfare and economic efficiency (to the profit of economic efficiency), etc., which have problematized the urban life quality after all.

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The fundamental question that guides this research and makes the context for it is that “Are there differences between the different regions of Abhar regarding the quality of life?”

So, the main goal of this research is to perform an spatial analysis on indexes of life quality by employing a mixture of objective and subjective indexes in the regions of Abhar city based on the 6 different economic, social, residential index and access to the public transport and environmental hygiene quality which were used in the form of synthesis from both objective and subjective indexes.

2. Significance of the research

Enhancing the quality of life is one of each society's goals, during the recent years, the researches on quality of life focused on urban environments and the quality of city life. The tendency to move to bigger cities across the world to focus in the bigger cities is one of the main reasons of paying attention to the concept of life quality in the researches. The important reason to consider the concept of life quality lays in the question while efficiently allocating the rare and limited resources. The findings in the context of life quality can be helpful in identifying the previous guidelines and designing planning policies for the future. According to this matter, the necessity of revising and analysing the indexes of life quality in the city of Abhar is essential to guide and develop the city in the future and to supply the fundamental needs of it.

3. Research Background

After studying and surveying the domestic and foreign references regarding this research, an excerpt from such researches is as follow: In a research paper titled “Health, environment and quality of life: an epidemiological perspective for urban development”, Augustinus Helander and Stetson mark the main signifiers of health and the related changes to the environment and social forces for the health status. To mark the epidemiological health status, indicators like prevention and hygienic observations, preservation of health, prevention of diseases and persuasion of hygiene, heredity, social environment, physical environment and the public lifestyle were analyzed. Results of that study indicated that environmental health should be the mandatory and multi-partial supplementary directed to deprived urban regions, organized policies regarding the social-economy, environmental and spatial aspects of neighborhoods and the range of environmental health sciences should be expanded into the urban planning, architecture, sociology, psychology, epidemiology, public health and environmental sciences (2003:53). Li and Weng started to study the quality of life by using objective indicators in the city of Indianapolis. The main purpose of that study was to present a method to infuse the census and remote

sensing data to evaluate the quality of life in GIS in the context of Indianapolis city. To extract the uncorrelated factors of life quality, factor analysis was employed and integrated indexes of the quality of life was developed using the resulting scores of factor analysis (Li and Weng, 2007). Lee analyzed the quality of life in the city of Taipei by using subjective indexes in year 2008 and a number of 331 persons of the city were analyzed in order to survey the subjective evaluation of the citizens. Results of the mentioned studies indicate that the living location, matrimonial relations, age, education and income impacts the different domains of satisfaction. In addition, situation of the society, local attachments and satisfactions from the neighborhood has the most impacts on the satisfaction of quality of life (Lee, 2008). Santos have evaluated the objective quality of life in the city of Porto by 2008, the analysis of citizens' viewpoints in regards about the quality of life was done by the multi-variable method in this research (Santos, 2007).

Bahraini and Tabibian (2008), have introduced a new method in evaluating the urban environment quality in a research with the title of “Evaluation of urban environment living model”. Fundamentals of that research were based on the method of indexes for identifying, categorizing and ordering the effective factors on the quality of the environment from the scratch. On the initial steps, twelve main indexes were categorized to order the mentioned factors which were sorted in three main fundamental demands (biological and physical), socio-economic and cultural demands. Results of the study led to the design of a model that has a tree structure and included two intense vertical and horizontal correspondences (Bahraini and Tabibian, 2008: 15).

Kokabi have done the case study on the city of Khorramabad his thesis with the title of “Planning in order to elevate the living quality of life in the city centers, a case study” (2004) have analyzed the city of Khorramabad by asking the following questions: What is the quality of city life and what are the socio-economic measures for defy and author it? Which patterns and guidelines can be employed to elevate the quality of life in the center of mentioned city? He analyzed and surveyed the subject by authoring certain measures in the skeletal, connecting and transport arenas with a focus on socio-economic aspects. In order to prioritize the mentioned criteria and sub-criteria and to specify standing of the city in the hierarchy of urban centers in the terms of levels of living, an hierarchical analysis was employed. Results of the studies indicates the situation of Khorramabad's city center in the category of the city centers with the low levels of quality of life (Kokabi, 2005: 7-9)

Garousi (et al, 2008), have diagnosed the levels of social assets and quality of life and the relation between these two variables in the different neighborhoods of Kerman city with the title of “Social assets and the quality of life in the city of Kerman). Results of this study indicated that the levels of social assets have a meaningful relationship with the levels of life quality and the connection between

these two variables is subordinated to the level of that specific neighborhood. In addition, the low levels of life quality among the citizens are somehow affected by their average social assets (Garousi and Naghavi, 2009: 61).

Faraji Molaei (et al, 2010), have analyzed the categorization of life quality with the SAW method in the neighborhoods of Babolsar city. Based on the results, although the residents of the urban regions can be having high standard of objective quality of life, they are not satisfied with their lives, it is the contrary for the slums where people may be satisfied with their lives. They have concluded that the qualities related to the constructed environments and other aspects of life quality is impactful on each individual's' feeling of satisfaction (Faraji Molaei. Et al, 2010: 21).

Alike the mentioned studies, this survey have also analyzed the indexes of the city life quality in the regions of Abhar city. From the distinction of this research we can refer to the consolidation of various rating models and to rate the different regions of Abhar city based on the integration of these models.

4. Theoretical basis of the research Definitions of the quality of life

The quality of life has a wide range of meanings for different individuals and groups. Some people consider it as a inhabitation capability of a region, and some other consider it as it's appealing degree, to some another it is considered as the public wellbeing, welfare, happiness and satisfaction (Epley and Menon, 2007:281).

However, still there is no acceptable universal definition for this concept since many of the researchers believe that the quality of life has a multi-dimensional, relational definition which is impacted by time, space and individual or social values.

The expansion approach which is the most clear approach with the notion of social expansion, defies the quality of life on the basis of reductions of poverty, increase in the employment, development of education, enhancement in social justice, expanse of rights of the minorities, and increase in the social integration in the whole society (Zahedi: 2004: 29). Although the quality of life was interpreted as the living standard in some references (Darvish Rahimabadi .et al, 2004; Jajarmi and Kelte, 2006: 6) but the standard of living and material progression constitute only one of the basis of living quality. WHO1 define the quality of living as the personal interpretation of an individual from his/ her living condition in relation to the culture and the/ her society's value system in addition to one's goals, expectations, standards and demands (Bowling, 1995). The life quality approach is a try to develop a healthy city and preparation of appropriate urban services available for everyone in the framework of stability; Thus, in a healthy city with the high level of living quality, skeletal/ socio-economic

conditions is present in line with empowering the citizens to deploy their plans and proliferation of their capacities. The definition of living quality would be subjected to change according to specific cultural, social, political and economic changes in a society. The definition of the living quality is affected by series of factors that form the fundamentals of life dynamism in an urban society (Rahnamaee, et al: 2011: 226)

5. Indexes and dimensions to measure the quality of life

Surveying the various researches in the literature of the living quality indicates that two fundamental series of components and processes are at work for specifying the living quality: The types that are dependent on a psychological process and causes the feeling of satisfaction and the second type are the ones which are dependent on the external conditions and excite internal processes (Lotfi and solaimani, 2009: 124). In regard to the first type, terms like "Quality of the personal life", "Well-being/"Welfare" and the "Living satisfaction" was used and for the second type the terms like "Social life quality" and "Quality of the location" and the "Quality of the environmental life" was employed (Massam, 2002: 1383). In regard to the subjective quality, the objective indexes are used and for the objective quality the objective indexes are used accordingly. The indexes should be based on authentic and available data in order to reduce the loss of time and costs, and they should report the existing conditions in a way that it is understandable for different types of people (Leitmann, 1999: 178). Some of the proportions that are used by the researchers in line with evaluation of living quality are as follow: Commings (1997), have considered the 7 main proportions of sentimental wellbeing, material welfare, social welfare, health, intimacy, efficacy and security as the main proportions of life quality and believes that these are the basis of the overall quality of life, he have defined these indexes for each of them:

- A. Material well-being: Living standard, individual standing, income, employment.
- B. Social well-being: Inhabitants' viewpoint on the quality of life, health, crimes, social embellishment and satisfaction of education services, neighbor's, services and accommodations, social living and other social relations.
- C. Emotional well-being: Leisure hobbies, immaterial activities, recreational and entertainments.
- D. Productivity: Jobs or other generative activities: Intimacy of social and family relationships and: Health and safety: environmental conditions, having feelings toward life and individual standing (Kim, 2002: 53)

According to the researches, by using conflated indexes of both objective and subjective dimension, the

¹ World Health Organization

quality of life is offered in the table no.1 in which each of the researchers have used some specific types of indexes.

6. Different indexes of living quality

Friedman (1997: 21) Economical indexes (Income, wealth and employment), Environmental indexes (Percentage of standard settlements, quality of air, expenses of transportation), Health index (death rates for the under one year old kids for 1000 births and the reported suicide rates), Educational indexes (Kids and adults that are educating in the schooling centers), Indexes of participation and collaborations, indexes of social security (robbery and addiction).

- Bonaiuto et al (2003): Spatial aspects (Majority of the architectural spaces - planning, organization and accessibility of the space, and green spaces), Human aspects (People and social relationships), Functional aspects (including welfare, leisure time, commercial activities, transit services) and territorial aspects (including stages of life, environmental health and high levels of security).
- Cardinal and K.Adin (2005: 5-7): Cultural (Percentage of aboriginal dwellers, percentage of people who are active in religious ceremonies), Hygienic (death rates for the under one year old kids, life expectancy, percentage of people with rare illnesses), Educational (Rate of the graduated students on the high education levels, number of schools and centers for higher education, number of students and university professors), crime and security (number of incarcerated people, rates of riots, robbery and addiction), Employment (rates of employment), Income (Percent of people under the poverty line, average of income), Land and resources (Levels of green spaces, rates of the protected areas), Air (Quality of the air, pollutant gasses), Rivers and shores, Housing (the preferable settlements, average of the number of people living in a room, demolished settlements), number of homeless people.

Zivelova and Jansky (2008: 1-14): Housing, economy and employment (The type of economic activity, unemployment, average of the income), environment and resources (protection of the outer city lands), city environment (rates of the traffic growth, access to the services, hygiene, and hygienic services, life expectancy, unexpected deaths, death of the children, learning and skills, secure society (level of crimes, type of crimes, fear of misdeeds in the city).

Source: Faraji Molaei (2011: A and B)

7. Research Methodology

In the following research a descriptive-analytical method was employed along with the use of objective and subjective indexes in a combination. In order to choose the under survey research, we behave according to the literature of the existing domestic, foreign studies. Most of the indexes are subjective, opinion of the citizens were asked and only 6 indexes (of Land value, Per Capita of literacy, Private ownership, quality of the structures, access to parks and green spaces, access to social accommodations and services) were objective. To a spatial analysis of the living quality in the city of Abhar, 6 main indexes were chosen which cover the impacting dimensions of the urban life quality. The statistical population is the citizens of the quadruplet districts of Abhar city, to estimate the sample volume the Cochran method was employed with a 95% level of significance; so, by using this formula, 386 persons from the inhabitants were chosen by a accidental sampling method to answer the questionnaire. The internal validity and stability of the questionnaire is analysed by the Cronbach alpha. The resulted validity is 78/0 which indicates an acceptable validity and internal stability of it. To defy the weight of (both objective and subjective) indexes, a hierarchical process method was utilised and to rate of the living quality in the quadruplet district of Abhar city, multi-criteria decision making approach was utilised. Also, to compare the levels of the districts' enjoyment, for each of the too much, very, average, low and too low option levels, certain scores were considered which include 1, 3, 5, 7, 9 respectively. The relative weight of each district is calculated by multiplication of each option to its weight and then the summation of all weight for each of the areas.

8. Area of the Study

The area of the study in this research is the city of Abhar and the quadruplet districts of it. Abhar city is considered as the second large city in Zanjan province with the population of 119,454 people according to the 2010 census and is also considered as the administrative and political center of Abhar Township. Abhar city is divided into four districts and 18 neighborhoods. The area of the existing city equals 81/1581 hectares. As one of the Zanjan province, Abhar had a enjoyed a rapid growth and expansion during the past decades, as it population have increased from 22184 in year 1976 to 81997 in year 2011, it means that the population have reached a 7/3 of growth during the duration of 7/3 decades. On the other hand, analysis of the inter-state transport of the population during the 1996-2006 indicates that Abhar has the second grade for the immigrants with the rate of 7/22% after Zanjan city (Zanjan's experimentation plan, 2010).

Table.1
The density and population of Abhar's urban areas

Urban Areas	Number of Population	Area of the zone	Density of Population	Rank of the population density
District 1	22149	384.63	57.58	2
District 2	35724	591.50	60.39	1
District 3	16204	410.93	39.43	3
District 4	7127	194.77	36.59	4

Figure No.1, Political situation of Abhar and the regions of Abhar city.

9. Data and Indexes

There is a vast diversity of the indexes employed in the context of urban living quality. This case is natural according to the multi-dimensional concept of urban living quality. According to the fact that two categories of indexes are employed for measuring the urban living quality, which is agreed by the most experts, in the projected literature we face two distinct approaches during the evaluation of urban living quality. The first approach includes objective indexes and the second is called the subjective indexes of urban living quality. According to the same fact, compilation of the indexes to uses in this research is based on the both of the objective and subjective categories. According to the universal literature of the subject of urban living quality, social/ economical/ skeletal standards, and the quality of services, availabilities and environmental hygiene quality Table no.3 Used indexes of the research

is in fact indicating the amount of citizens' satisfaction from their residential locality which are considered as the main indexes on all of the studies. In some of the studies, different levels of living qualities were subjected in each of the criteria. In this project an integrative point of view to the criteria was considered.

In this project, a total number of 15 indexes were employed to do a spatial analysis of the living quality indexes in the urban areas of Abhar city. Compilation of the objective indexes of life quality was based on the existing indexes in the elaborative plans, data of the population and housing census and control maps of the territories of Abhar city while the subjective indexes were collected based on the questionnaire. In the table number 3, the indexes of life quality which are used in the following research were introduced.

Table.2
Sub-Indexes

Criterion	index	Sub-index
Social	Quality neighborly relations	Recognition of the neighbors Amount of relations between the neighbors Neighbors cooperation amount
	Quality of the security	Criminal related spaces Felony Disturbance by the youth
	Quality of social cooperation	Tendency to cooperate in reconstruction projects. Cooperation in tradition religious ceremonies of the neighborhood.
	The amount of satisfaction from the neighborhood	The feeling of belonging to the neighborhoods. Relative satisfaction with the neighborhoods
	Rate of literacy	
Economic	The average land value	The average land value on the regional level

	Average income	The levels of monthly savings
	Types of ownership	Private State
Physical	Value of residential units	Type of material Quality of the structures Age of the establishment
Access to services, accommodations and urban equipment's	Access to parks and green spaces	Per Capita of access to the parks in the region
	Access to urban services and accommodations	Per Capita of educational centers Per Capita of commercial centers Per Capita of therapeutic centers
Public transit	access to the public transportation	Ease of access to inter-city taxis The efficiency of the public transit system
Quality of environmental hygiene	Quality of the streets, lanes and pedestrian pathways	Lighting during the nights Flooring

(Source: The authors)

10. Methodology of multi-criteria and Multi-attribute decision making

Regularly, in each case, one or more criteria of decisions are considered like profit, expense, delectability and unreliability. If the mentioned case is only aiming to enhance one goal or criteria, it is called one-criterion, but if more than one criterion is considered by the decision-maker, the latter would be called a multi-criteria decision making² case. Decision making with multifold criteria is a topic that pays to the process of decision making in the presence of various different - and in sometimes contradictory criteria (Colson, 1989). Regardless of the wide span of the MCDN usages, some of the shared topics are exist in all of the cases that are marked as the common-specifications.

Image No.1 - Common specifications of different types of multi-criteria decision making approaches

Multi-attribute models can be divided into two main discrete and continuous categories. If the bundle of acceptable answers (Fd) is countable, the multi-attribute subject is considered as discrete (Korhonen .et al, 1992). Some of the authors like Hwang and Yun and Zimmerman have abbreviated these types of cases as the Multi-Attribute Decision Analysis (MADM). If the sum of acceptable answers is uncountable, we call that multi-attributed subject as a continuous case. The multi-attributed decision making techniques try to show how the best alternative can be chosen from the viewpoint of the decision-maker and with the use of data.

Finally, although rating of living quality in the city of Abhar was studied with different multi-attribute decision-making methods, their results is showing a minute difference but in order to optimally combine the results the Copeland method was utilized to perform the final rating of the mentioned areas.

Discussion and Findings.

In this section an attention would be payed to the analysis of spatial distribution of the indexes of living quality in the quadruplet districts of Abhar city with a focus on the above mentioned theoretical basis regarding the employed models in this research.

In order to compare the ranking of districts for their enjoyment of subjective indexes, certain weights [of too much, medium, low, too low] were considered for each of the answers choices in the questionnaire which are 1, 3, 5, 7, 9 respectively. The relative weight of each district is calculated by multiplication of each option to its weight and then the summation of all weight for each of the areas.

² MCDM (Multi Criteria Decision Making)

Table.3
Employed indexes in the spatial analysis of living quality in the districts of Abhar

Criterion	Neighborhood relation zones	Quality of the security	Quality of the social participation	Satisfaction of the citizens from the neighborhoods	Rate of the literacy	Land Value	Income (Monthly savings)	Private ownership	Quality of residential units	Access to parks and green spaces	Existing services and facilities in the sub regions	Quality of the access to the public transit	Quality of the streets and alleys	Quality of the wastewater and garbage dump
1	6.04	6.68	6.1	6.7	87	1000000	300000	86	21.28	0.86	4.26	6.2	5.94	6.36
2	6.36	5.88	6.5	6.84	89	1500000	240000	87	20.91	5.06	14.87	6.64	5.44	5.84
3	6.18	5.86	6.82	6.4	90	700000	200000	85	22.16	4.09	3.7	6.62	5.24	5.62
4	6.7	5.76	5.64	5.5	85	250000	100000	78	19.88	1.8	8.63	5.4	5.2	5.2

(Source: The authors 2015)

Table.4
Output results of the descaled matrix in the indexes

Criterion	Neighborhood relation zones	Quality of the security	Quality of the social participation	Satisfaction of the citizens from the neighborhoods	Rate of the literacy	Land Value	Income (Monthly savings)	Private ownership	Quality of residential units	Access to parks and green spaces	Existing services and facilities in the sub regions	Quality of the access to the public transit	Quality of the streets and alleys	Quality of the wastewater and garbage dump
w	0.0375	0.2119	0.0168	0.0424	0.022	0.0743	0.1401	0.009	0.0828	0.1826	0.1295	0.027	0.0109	0.0132

(Source: The authors 2013)

Rating of the district based on the linear allocation in the SAW model, Rating of the district in the ELECTRE model,

rating of the district based on the TOPSIS method.

Table.5
Rating the areas regarding the indexes of the living quality based on the models of the research.

	Rank region in TOPSIS	Rank region in Electre	Rank region in Saw	Rank region based on Linear Allocation	Rank region in Vikor
District 1	3	2	4	1	2
District 2	1	1	1	2	1
District 3	2	3	2	3	3
District 4	4	4	4	4	4

(Source: The authors)

According to the table number 6, even with slight differences in the indexes of living quality based on the models of the research, to efficiently combine the results of the study in order to perform the final rating of different district of Abhar city, a tripartite combination method (Arithmetic average, Vectorial and Coupland method) is utilized.

Final Rating of the areas using the tripartite consolidated methods

As we can see, each of the rating approaches have offered somehow similar results regarding the rating of Abhar city's urban areas based on the indexes of living quality. In order to reach for a unified/ single result and to employ the priorities the options in the real world, the tripartite integration can be used in the following order to perform the rating.

The arithmetical average method: In this approach, ideas are taken from five different rating methods (of VIKOR, ELECTRE, TOPSIS, SAW and the Linear Allocation) and the choices that indicate the lower numeral average would have the priority. This calculation has been done in Table.5

As an example/ sample, district 1 have gained the third rank in the topsis approach, the second in the ELECTRE,

$$T_i = \sum w_i - \sum d_i \text{ Score}$$

$$T_1 = 2 - 1 = 1$$

$$T_2 = 3 - 0 = 3$$

$$T_3 = 1 - 2 = -1$$

$$T_4 = 0 - 3 = -3$$

In the end, we would reach for an average as follow:

District 4 < District 3 < District 1 < District 2

- Forming an integral rating set: After employing such approaches, in order to make a consensus and result from the three mentioned methods, a

$$O_1 = \text{District 2} \ll \text{District 1} \ll \text{District 3} \ll \text{District 4}$$

$$O_2 = \text{District 2} \ll \text{District 1} \ll \text{District 3} \ll \text{District 4}$$

$$O_3 = \text{District 2} \ll \text{District 1} \ll \text{District 3} \ll \text{District 4}$$

and first in the linear allocation. By calculating the arithmetic average from the ranking of each area in different approaches and inscribing in in the last row of the Table No.7, ranking of the different areas of Abhar city based on the indexes of living quality will be as below:

District 4> District 3> District 1> District 2

- The vectorial approach: In this approach, rating of each of two choices is compared in different combinations and if the number of combinations in which the value of SL is preferable to SL was more than those in which SL is preferable to SL it is indicated with a Q and if the number of SK's priorities is less than SL or equal it, it would be indicated with the letter "D". This way, W's indicated the number of vectors and D's mark the number of losses; so, according to the Table No. 8 we have the following results:
- The Cupland method: This method can be pronounced as a development of the previous method, since in this approach the amounts of D's are also considered in the prioritizing in addition to the amounts of Ws. So, the score of the choices in this approach would be as the following set:

minor rating set (POSET) can be extracted with integration of such methods with the following detail.

As you can see, district 2 is preferable than others in all of the ratings whole district 4 was preferable in

comparison with other areas in the terms of quality of life.

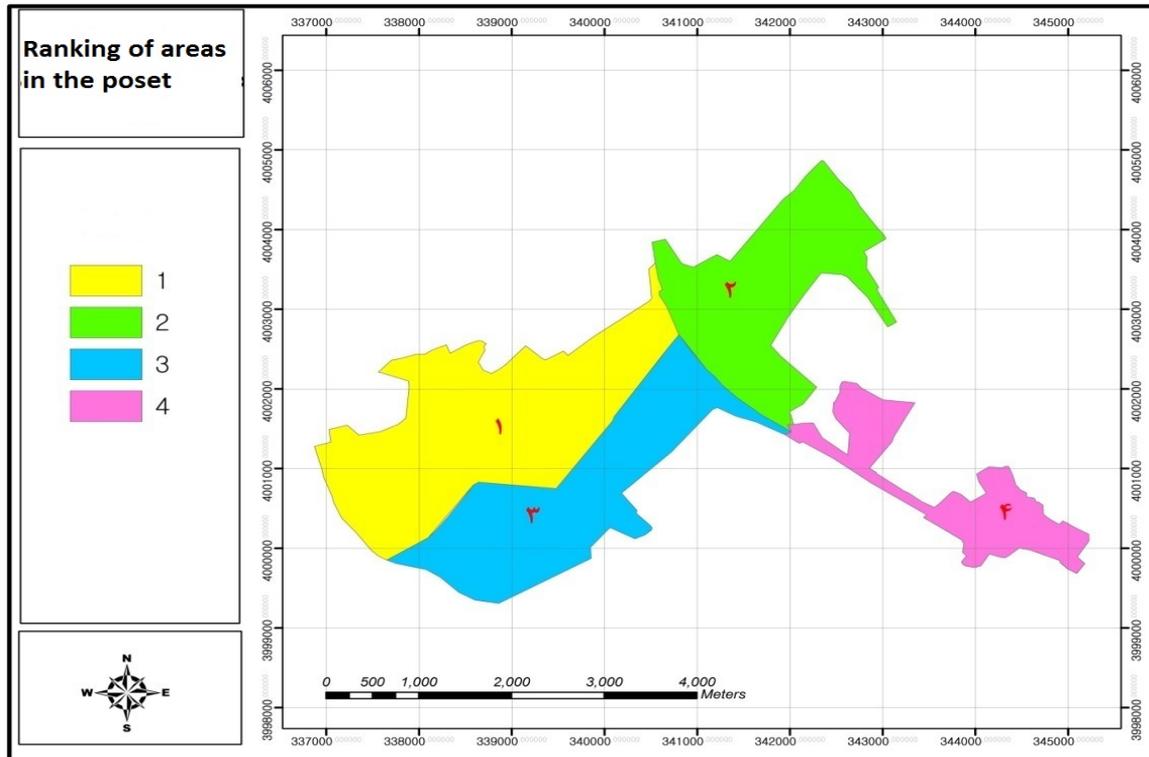


Fig.1. Rating of the different districts of Abhar city on the perspective of life quality based on the POSET approach

According to the figure number 1, the results of the living quality indexes indicate that different districts of Abhar city has a different value of living quality due to the different spaces and the unbalanced/ unequal distribution of services and facilities and the different economical-social conditions. On an overall analysis, results of the following research indicates that the quadruplet district of Abhar city enjoy a similar condition in some of the indexes including quality of neighborhoods relations, per capita of literacy, private ownership and the quality of residential units while they had some enormous difference in some indexes including: average land value, average of income, access to parks and green spaces and the overall satisfaction regarding the access to the facilities of welfare in which some of them is due to the distinct economical specifications and existing facilities and services in the district. The first districts of the city had a more desirable condition in the majority of the utilized indexes in comparison to other districts which resulted in its first rank among the other districts in the terms of living quality. Some of the indexes in the second district were more desirable condition in comparison to the first district but there are some issues in the field of skeletal conditions, access to the services, transit and the quality of environment. In the third and fourth district, most of the indexes has an undesirable conditions

whilesub-indexes of economical standards of living quality has a desirable condition which can be helpful in elevating other indexes.

11. Adding ups and Conclusions

The starting point of the human communities is to have a correct realization of human needs and to monitor the accomplishments of the development. Measurement of the quality of life offers a suitable implement for such realization because studying the quality of life is a pathway between the local officers and citizens as a constructive interaction that leads to the interpretation and discussion about the key impacting subjects on the lives of people. On the other hand, evaluation of the inhabitants of the cities regarding the situation of their living place situation in the form of hierarchical patterns and comparison of their satisfaction and their demands can be effective on recognition of the existing situation, and bringing the awareness toward the weak or strong points directly and indirectly. To evaluate and spatially analyses the indexes of life quality in the city of Abhar, a number of 14 indexes was finally selected in this research by studying the theoretical basis and the literature of the research in addition to the exploratory studies in different

regions of the city, since each of the mentioned levels and indexes possess different degrees of importance in their scales while measuring the quality of life, a multi-criteria hierarchical method of decision making (AHP) was employed to analyses each of these levels and indexes according to their significance, efficacy and the role on the quality of life appropriately and methods of TOPSIS, ELECTRE, VIKOR and linear allocation was utilized to order different districts of Abhar city in the terms of living quality. Ultimately, to optimally combine the results for ordering the districts of Abhar city, a method was employed that merged the triple methods of arithmetical average, vectorial and coupland.

In the terms of living quality indexes, the second district of Abhar city was place in the first rank due to possessing the highest score while the fourth district was placed in the last rank since it possesses the lowest score; in fact, in comparison with other districts the condition of district 4 is not desirable.

By marking the regions and districts of the city which have the higher rank and lower measures of living quality indexes, we can pay to the issues and shortcomings of those urban regions - by recognizing the indexes that are being used and the shortcomings of such indexes in different regions of Abhar city - to eliminate such shortcomings with the use of specific programs.

In the end, according to the findings of the research and in order to elevate the quality of life on the surveyed area of the research, the following recommendations can be helpful:

1. Development of facilities and accommodations in a balanced way across the districts, especially in the 3rd and 4th districts in which the facilities and accommodations related to shopping and transportation are not ideal.
2. Idealizing the skeletal situation of the district 4 with improvement plans and introducing tax incentives in order to upgrade the quality of settlements and old textures in this area.
3. Elevating the green spaces in the 1st region. According to the low ca capitiation of green spaces in the first district, the expansion of urban green spaces and development of parks in the mentioned district seems mandatory.
4. Investment in order to enhance the public transit fleet in quadruplet districts of Abhar. According to the equal condition of quadruplet conditions of the city in regard to the indexes of transportation, investment in the case of public transit development and desirable access of the citizens is urgent.
5. According to the high levels of social indexes through social standards in the quadruplet districts of Abhar city, these social assets can be used in line with the participation of the residents on the regional level.

References:

- 1) Asgharpour, Mohammadjavad (2009), Multi-Criteria Decision Making, Tehran university press, pp, 260-266.
- 2) Bahraini, Seyyed Hassan, Tabibian, Manouchehr (1998), A model for evaluating the quality of natural environment, Environmentology Magazine, Vol. 26, Issue number 21, Summer 1998.
- 3) Jaremi, Kazem, Kalteh, Ebrahim (2006), Measuring the conditions of urban life quality in the city from the viewpoint of the citizens.
- 4) Bowling A, (1995), The concept of Quality of life in relation to health, medicina Nei Secoli, Vol.7, Bulletin of the World Health organization, March 2004,82 (3), PP.633-645.
- 5) Campbell J. M.; (1983), Ambient stressors; Environment and Behavior, Vol.15, No.3. p.27
- 6) Colson G, Bruyn CD (1989), Models and methods in multiple objectives decision making. Math. Comput. Modelling 1989;12: PP.1201–
- 7) Costanza, R. (2007), Quality of life: An approach integrating opportunities, human needs, and subjective well-being, Ecological Economics, 61(2-3).
- 8) Das, D., (2008), Urban Quality of Life: A case study of Guwahati, Social Indicators Research, 88, P. 2
- 9) Hollander, Augustinus E.M. Staatsen, Brigit A.M.,(2003), Health, environment and quality of life: an epidemiological, Journal of Landscape and Urban Planning 65, PP. 53–62.
- 10) Kim, Kyungmi., (2002), The effects of tourism impacts upon quality of life of residents in the community, Dissertation submitted to the Faculty of the Virginia Polytechnic Institute and State University In partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY In Hospitality and Tourism Management.
- 11) Lee, Y.-J., (2008), Subjective quality of life measurement in Taipei, Building and Environment, 43(7).
- 12) Leitmann, Josef (1999), Can city QOL indicators be objective and relevant? Towards a participatory tool for sustaining urban development', Local Environment, 4: 2, PP.169–180.
- 13) Lotfi, Sedigheh. Karim, Solaimani, (2009), An assessment of Urban Quality of Life by Using Analytic Hierarchy Process Approach (Case study: Comparative Study of Quality of Life in the North of Iran), Department of Urban Planning, Journal of Social Sciences 5(2), PP.123-133.
- 14) Li, G. and Weng, Q., (2007), measuring the quality of life in city of Indianapolis by integration of remote sensing and census data, International Journal of Remote Sensing, 28(2).

- 15) Massam, B.H. (2002), Quality of life: Public planning and private living. *Progress in Planning*, 58: PP.141–227.
- 16) Megone, C. (1990).The quality of life: Starting from Aristotle. In: Baldwin, S., Godfrey, C.,Propper, C. (Eds.), *Quality of Life: Perspectives and Policies*. Biddles, London, pp. 28-41
- 17) Saari & Merlin. (1994), the Copland Method I: Relationships And The Dictionary, Discussion Paper No. 8, pp.51-76.
- 18) Santos, L. and Martins, I., (2007), *Monitoring Urban Quality of Life: The Porto experience*, Social Indicators Research, P. 80.
- 19) Smith, D.M.)2002(, quality of life: Human welfare and social justice, Translation Hosain Hatami nejhada, *Journal of Political– economic information*, (17), NO, 185-186, P160-173.
- 20) Wang, J., Lin, Z., Zhang, G. (2008), A Decision Model for IS Outsourcing Based on AHP And ELECTREIII, *Wireless Communications, Networking and Mobile Computing*, 4th International Conference, pp.68-81