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Research Article

OPTIMAL LOCATION SELECTION FOR CULTURE ACADEMY AND ART CREATOIN CENTERS OF GAZVIN BASED ON ANALYTIC NETWORK PROCESS

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ABSTRACT
Today, Identifying harms caused by cultural application to resolve some cultural problems in cities seems vital .So determining appropriate criteria and optimal location selecting for urban application is essential. The city of Gazvin was selected because it was in a bad condition based on the criteria discussed above. Based on theoretical discussions and our aim, in this study we made an effort to arrive at an optimal model for the location of academy and art creation centers in Gazvin through a descriptive and applied methodology. We employed field and library studies to gain our objective. Also, GIS software as well as ANP method was employed to analyze data and add reliability to our findings. Observing layer overlapping of maps, we noticed a mismatch and dispersion in applications in Gazvin. Priorities were determined through the above- mentioned model and optimal locations for artistic and cultural centers were determined. Besides, due to increasing process of the city, we made sure that the number of such centers doesn't exist in standard share and because of developmental procedure of city, location in north part seems desirable.

Keywords: *Location Selection, Location Position, Academy, Artistic Creations, Network Analysis, ANP, GIS*

INTRODUCTION
We have wintered some harmful effects in recent decades due to an increase in population and quick growth of city dwelling. Of these, we can mention undesirable and fast growth of cities, creation of marginal areas, poverty, lack of city standards, lack of recreational centers, and inequality in access to facilities (Gazizadeh 1991; Hesamian 1999).
The studies reveal that the urban applications can considerably change in a short period (10 to 20 years) (Cities alliance, 2006).
Urban development and population growth should be accompanied by access relief and this cannot occur unless we gain location selection based on desirable and scientific parameters and based on efficacy, health, security, comfort, and stability standards (Pourmohammadi, 2013).
Various factors as well as environmental variables and also the complexity of location selection process are important reasons why this is an important activity. Professional experts often view design based on the kind of its product and most of the literature of urban design is considered in the prospective (Long, 2006).
At the moment, the views and ideas of urban design have had considerable changes compared with past and have been modified from product – oriented to processes – oriented basis (Punter, 1997).
In the past, the parameters for location finding were limited. About four decades ago, Ahmed Azimi states in his book titled as "Urban construction lessons" that for determining location traits, two guiding factors, namely, social welfare and economic welfare is of significance (Azimi, 1971).
However, today the formation of environmental standards like (SIC and EIS), Modern development of cities, the promotion of urban welfare, and many other factors along with architects, responsibility to answer social failures and considered as significant broadening the issue of location selection.
Different methods like ANP are used for location selection. ANP is a multi-purpose comprehensive method in decision making and is applied in many decision- making situations in which the

interdependence between factors seems essential. In studies performed by MEADE and Sarkis, ANP was used for strategic evaluation and speed improvement of products [Meade and Sarkis, 1998). Besides, ANP was employed by lee and kim in a study concerning the selection process of information system project (Lee and Kim, 2001). ANP was first introduced by Saati (1994), Momeni (2013). The present study based on rational principles endeavors to tackle why and how optimal conditions can be created for locating academy and art creation centers of Gazvin.

Gazvin as an old city is the center of Gazvin province extended to Alborz Mountains from north and from east west, and south is limited by traditional gardens. According to the comprehensive admitted plan, it is an area of 3003 hectare. It has a population of 355338 people and is the biggest city of province. Gazvin holds the geographic features of 48 degrees and 85 minutes to 50 degrees and 51 minutes east length Greenwich meridium and 36 degrees and 7 minutes to 36 degrees and 48 minutes north width to Eaquator. The average temperature is 14, 27 (in a period of 46 years) and an average amount of rainfall is 316 millimeters (the same period). Its height from sea level is 1279/2 meters and its average humidity is annually 51%. The depth of underground waters is around 47 to 50 meters (statistics of 46 years from Gazvin synoptic metereology station, 2013). Gazvin common winds: 1- foggy wind bellowing from west and northwest during the year and is a companied by Gillan and Azergbyjan humidity and cold weather.

2-Raz wind blowing from southeast in the beginning of spring and summer. It is warm and less humid. 3-Gagazan wing, which is local and cold and blows from northwest.

Gazvin is divided in to 3 mountainous areas, north mountain feet of central Iran (Gazvin plain). The highest point of the city is about 1370 meters in north and the lowest point is 1277 meters in south and the common steep of the city is towards south and is an average of 1 percent (Zahrai, 2004).

MATERIALS AND METHODS

This paper follows an applied method and the studying procedure is descriptive and analytic.

The data was gathered in a library and documentary way and a direct and field method of observation like interview with people and experts and questionnaires were employed

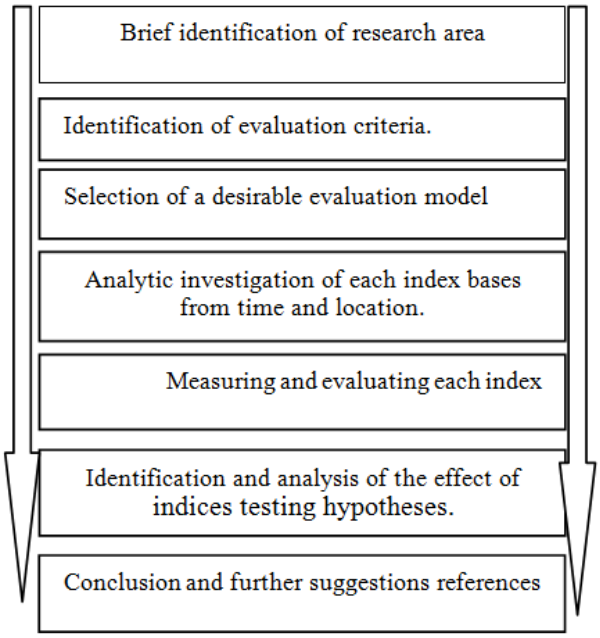


Figure 1: Staged figure of research process

Analytic Network Process (ANP); in location selection literature, different methods, are known. One of the most important factors in decision making is multi criteria decision making (MCDM) in which the

best choice is selected considering many factors (Abdoos and Mozayani, 2007). In this kind of decision making more than one factor is involved in choice selection. These factors can be qualitative, quantitative, positive, and negative (Godsipour, 2005). These decision making models (MCDM) are divided into two categories. Multiobjective decision making and multi attribute decision making (MODM and MADM) (Momeni, 2013).

One of the techniques of multi objective decision making is AHP suggested by Saati and is based on the analysis of human brain for complex and phase problems (Asgarzadeh, 2013).

Another technique of MADM is analysis of network process (ANP). This is a compensating model base in analytic hierarchical process (AHP). The only difference is that instead of hierarchic, network has been used in it.

The premise is that higher levels are independent of lower levels and dependence between factors is not considered. However, in most decision making situation this inter independence is not feasible and Saati suggests that we need to inter connect the elements and employ ANP technique (Saaty, 1980, 1977, 2005).

In this process, the relation between various levels of decision making is mono directional. The evaluation of indices is based on their relation rather than their hierarchy, so ANP can be considered the most desirable technique. ANP model includes control hierarchy, elements and element relations.

Most of the issues in decision making cannot be classified and hierarchy basis since in some of these problems, elements and levels are mutually inter -dependent (Chung *et al.*, 2005).

On the other hand, AHP cannot measure the possible inter dependence among factors (Leskinen and others, 2006).

Analysis Process Model

1- Identification of Criteria

Saaty introduces 4 criteria, which consist of 1- profits, 2- opportunities. 3- Expenses, 4- risk.

2- Relative Weight of Criteria

In ANP technique criteria weighing are done like AHP and it is achieved through pair comparison of criteria and sub criteria (Pair comparison is done based on relative importance of that index compared with that of control index).

The measurement basis is 9-1 in which 1 stands for importance of variable i to variable j (Chang and Dauila, 2006).

The relative importance of variable in line I considering column j am gained through the following formula: aij=wi/wj

It the importance of j is more than i, the reverse value of 1/ai is used and n number of items is compared.

According to Saaty, the last weight extreme derives from Aw= λ_{max} . λ_{max} the maximum amount of Matrix A.

The formula $\alpha = \sum_{i=1}^{n} Wi$= lvi is used to make normal extreme W.

For determining the adaptability level of comparisons, CI, which weight adaptation index, is used. (If CI is less than 0.1, the comparison is confirmed). $CI = \frac{\lambda_{max} - n}{n-1}$.

Now, considering all criteria, pair comparison is done in two stages,. a- Element level, b- inter-cluster comparison enters the matrix after the results.

3- Formation of Primary Super Matrix

ANP elements are in interaction with each other. The elements can be units of decision making, criteria, sub criteria, achieved results, options, and any other things:

- The relative weight of every matrix is measured based on pair comparison like in AHP technique. Product weights enter super matrix.

W_{ij} matrix includes relative weights of W extremes and the effects of elements in i th cluster on j the cluster. (Internal dependence is zero (W_{ij}) if i th cluster doesn't affect j th cluster).

Nn $\rightarrow$ o elements multiplied by Cluster N

Wij → Block matrix
CN → Nth cluster

Table 2: Overall form of super matrix A

					C_1				C_2			C_N			
		e_{11}	e_{12}	…	e_{1n_1}	e_{21}	e_{22}	…	e_{2n_2}	…	e_{N1}	e_{N2}	…	e_{Nn}
C_1	e_{11}				W_{11}				W_{12}	…				W_{1N}
	e_{12}													
	…													
	e_{1n1}													
C_2	e_{21}				W_{21}				W_{22}	…				W_{2N}
	e_{22}													
	…													
	e_{2n2}													
…	…				…				…	…				…
C_3	eN_1				W_{N1}				W_{N2}	…				W_{NN}
	eN_2													
	….													
	eNn													

4- Formation of Weight Super Matrix

-this super matrix consists of several special extremes in which the total amount of each extreme is one.
- In primary super matrix it is possible that the total of each primary column be more than one.
-For making every Matrix column standard, we factor from column elements in terms of their weight.
-Now, the new matrix is achieved in which the total of every column is one.

5- Measuring General Weight Extreme

- Weight super matrix is multiplied so that matrix elements can be convergent and is line amounts are equal. It is determined as a result of general weight extreme.

12- "Investigation the vulnerability of Buildings against earth quake in Gazvin" Housing and building organization publications.

Limit matrix is achieved through the power of weight matrix and the moments of all lines are the same.

It the super matrix has a chain-like effect; we may have two or more super matrix. With addition of every line, the weight super matrix can be convergent.

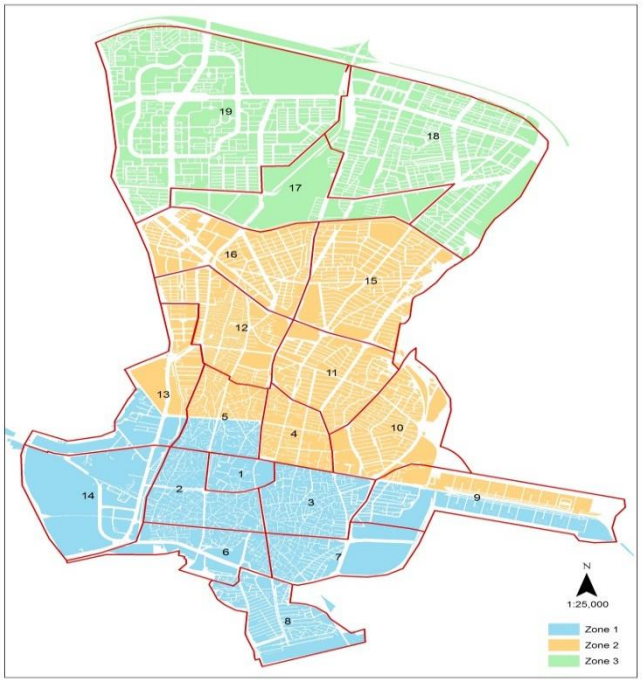
6-Location Selecting Plan of Academy and Art-creating Centers of the City

a. Dividing the city into certain regions and estimating the need level of each region (Drudging the city into 19 areas and 3 sections).

b- Estimating the number of academies needed by each region. (Estimation of each area population and determining the number of academies in terms of population).

C- Location finding through the use of GIS- first through choice soft wares, we extract the number of subcriteria and then we do layering in GIS software considering expert indications.

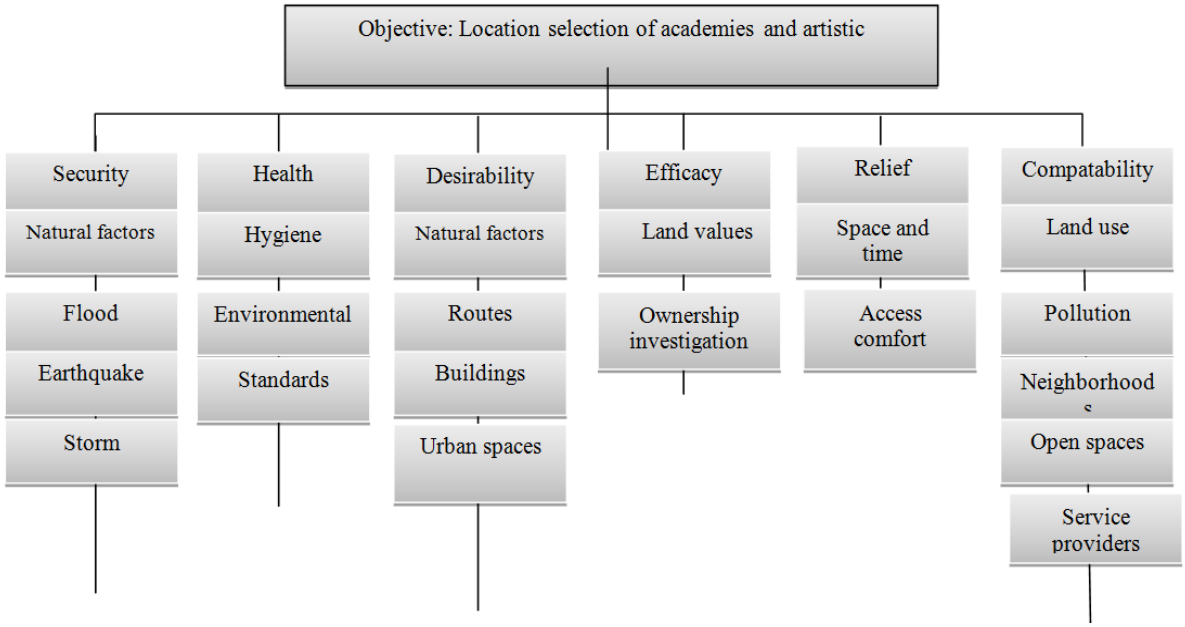
Finally, through adding the defined layers, we identify optimal locations for academies and artistic centers.



Map 1: Dividing Gazvin city into 19 regions and 3 sections
Source= Comprehensive studies of Gazvin (Supervising enginery of urban planning, 2015**)**

6-Criteria and Sub-criteria Priorities involved in Locating Academics and Art-creating Centers in the City

1- Formation of a hierarchical tree diagram (figure 1)
2- Pair comparison of criteria and sub-criteria (Figures 2 and 8 and identifying layer weights with the help of GIS.
3- Adding all information layers together and identifying optimal places (Map no.2).



Figures 1: Hierarchical tree diagram for locating academies and art – creating centers in Gazvin

Table 1: Evaluation results of considered indices in 19 regions of numerical period from 0-1

Security	Health	Desirability	Efficacy	Relief	Compatability	Urban areas
0/647	0/512	0/592	0/727	0/611	0/691	1
0/573	0/437	0/372	0/563	0/198	0/549	2
0/658	0/587	0/452	0/618	0/441	0/497	3
0/652	0/572	0/559	0/849	0/848	0/853	4
0/566	0/598	0/471	0/701	0/537	0/629	5
0/312	0/367	0/356	0/242	0/277	0/397	6
0/318	0/566	0/396	0/272	0/257	0/249	7
0/297	0/541	0/312	0/341	0/214	0/229	8
0/584	0/542	0/471	0/452	0/415	0/447	9
0/702	0/718	0/642	0/841	0/784	0/704	10
0/797	0/725	0/672	0/617	0/829	0/847	11
0/511	0/381	0/495	0/312	0/631	0/693	12
0/320	0/301	0/410	0/303	0/194	0/218	13
0/213	0/267	0/298	0/642	0/182	0/234	14
0/733	0/723	0/541	0/521	0/621	0/621	15
0/612	0/622	0/532	0/651	0/452	0/442	16
0/590	0/467	0/576	0/512	0/582	0/612	17
0/766	0/828	0/607	0/861	0/731	0/898	18
0/728	0/762	0/597	0/842	0/702	0/641	19

Source =outhors

Table 2: Final weight of each index

Indicator	Security	Health	Desirability	Efficacy	Relief	Compatability
E= Energy	0/828	0/910	0/863	0/969	0/903	0/934
d-deviance degree	0/097	0/144	0/077	0/083	0/092	0/064
W- indicator weights	0/267	0/321	0/196	0/164	0/201	0/123

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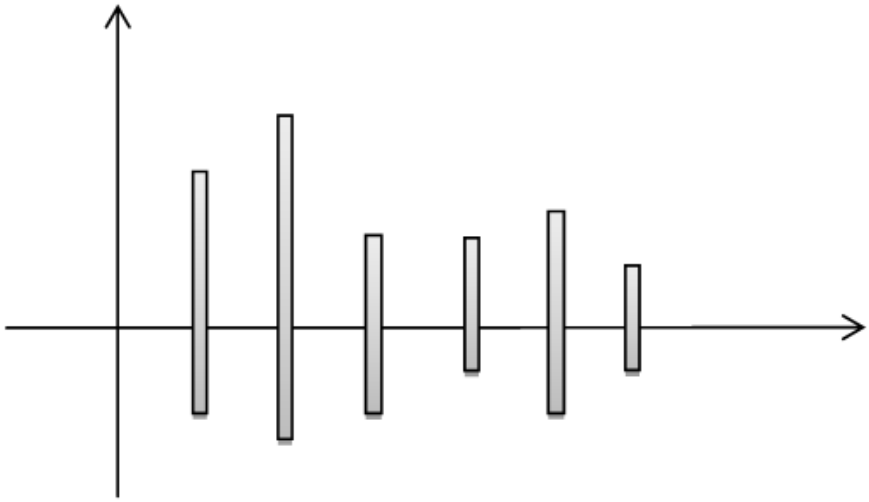


Figure 2: Final weight of each indicator (source-authors)

Pair Comparison of Criteria and Sub-criteria based on Weight

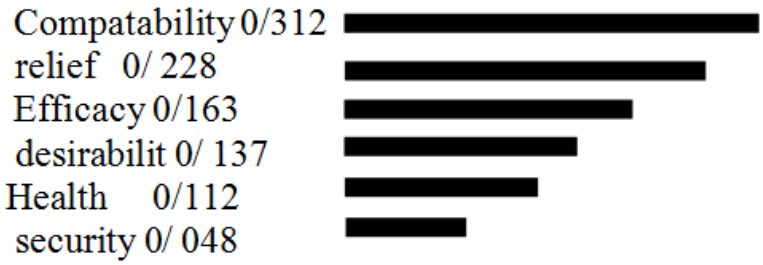


Figure 3: Pair comparison of criteria for locating academics and artistic centers in Gazvin

Based on hierarchical processes method, after comparing basic criteria, sub-criteria should also be compared. So we will investigate priorities for sub-criteria of each indicator separately.

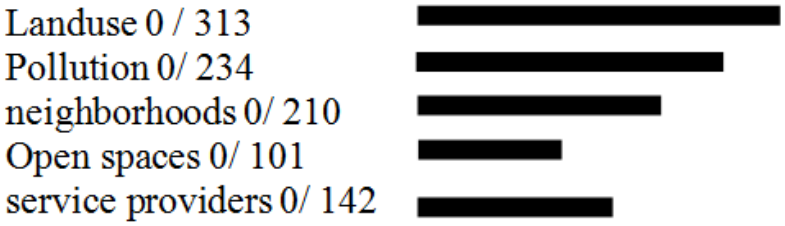


Figure 4: Pair comparison of sub-criteria for compatibility

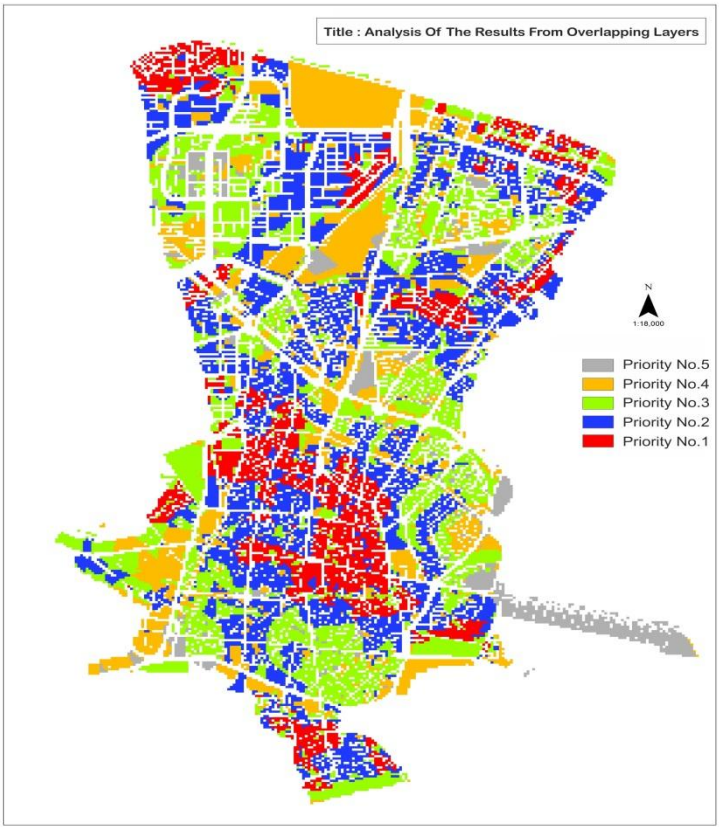
Figure 5: Pair comparison of sub-criteria for relief

Figure 6: Pair comparison of sub-criteria for efficacy

Figure 7: Pair comparison of sub-criteria for desirability

Figure 8: Pair comparison of sub criteria for health

Figure 9: Pair comparison of sub criteria for security



Map 2: Adding layers of information together and determining optimal place priorities

Table 3: Priorities for locating academies and art-creation centers in 19 urban regions of Gazvin

Priority	Region
First	11
second	18
third	10
fourth	4
fifth	19

Conclusion

During recent years, due to quick growth of city dwelling on one hard and lack of a systematic organization for planning and management in Gazvin, space allocation for cultural application has faced many problems. Cultural spaces as very important urban applications have faced problems like shortage and being located in desirable places, unpredictability, and lack of future considerations are some main problems of these centers. In this paper,we tried to analyze optimal priorities of location for cultural centers in Gazvin based on available standards and by means of geographical information as well as ANP model. The first priority was region 11 because of being located in research area and being the most

accessible area. However, based on land price, it is the most expensive. The results revealed that this area is the most optimal location. It should be mentioned that in the year 1390, Gazvin city hall built Banoo academy in this area in the neighborhood of HasbtBehesht park. The second priority was region 18, which is part of the new urban section. The design of Pardis academy hears Nili alley has been finalized and will start very soon.

The third priority was region to which lacks any king of artistic center, so in the MA dissertation of the present author, academy site and artistic center of Gazvin was identified have and was also defined and designed. In the end, it seems that considering our research questions and achieved results of the present paper, we can claim to have arrived at certain optimal locations for academics and artistic centers in Gazvin based on scientific methods and stability perspectives.

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