

## Analysis of Spatial Distribution of Population and Utilities on the Basis of Spatial Justice (Case Study: Ardabil)

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Received: 29 May 2015 Accepted: 22 October 2015

### Extended Abstract

#### Introduction

Spatial inequalities in establishment of municipal activities and different levels of residents wealth in various areas of a city, is not a new phenomenon in the cities all over the world. In developing countries, because of egregious social and economic differences, and due to inequality and imbalance in municipal services distribution, spatial differences of cities have been exacerbated (Abdi, Daneshpour, 1998). Spatial structure of a city is composed of components and elements which have reactions on each other. Therefore, instability of each of these components will have an effect on the whole structure (Savj & Vard, 2001, 90). To this reason, an organized spatial balance in cities is considered as a kind of municipal stability and will be realized when a logical compatibility is created between population scattering and service distribution in cities. As a result, appropriate and optimal distribution of social, economic, cultural, and sanitary facilities between regions and areas is one of the most important factors to prevent inequalities, development gap, and inappropriate spatial distribution of population on the areas of land. In planning for growth and development of different urban areas, it is essential to know the position and place of regions as one of the most important factors in achievement of a balanced municipal development. In some urban regions, service distribution is better than other regions, flow of people will head towards these regions, and subsequently social and environmental problems and issues will come up (Sarvestani, 2008, 6). In line with the policy of spatial justice, as a pivotal goal of country development plans, it is necessary to investigate the status of different regions with respect to services distribution and level of various infrastructural and socio-economic indexes, as well as to focus on deficiencies and insufficiencies for the future development plans.

In the recent years, conversion of Ardebil City into a provincial capital has caused a rapid physical expansion of this city. This, in turn, has caused serious problems. One of the most important of the problems is socio-spatial imbalance. Selection of this city as the provincial capital in 1996 has broken balanced and homogeneous spatial organization of the city. Inharmonious skeletal and physical development of the city has caused ecologic segregation. As

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a result, some of the areas and districts of the city have better accessibility to services, while some other districts, usually with higher population, have inappropriate access to the services.

The most important questions of this research are including: Is municipal services distribution well balanced in all areas of Ardebil City? Is there a meaningful relation between spatial population distribution and services distribution in all areas of Ardebil? Is there a meaningful relation between population density and services distribution in areas of Ardebil?

In order to explain the aforementioned questions the following assumptions are presented: Services in Ardebil city have not been distributed in a balanced manner. There is a direct meaningful relation between population scattering and municipal services distribution in the areas of Ardebil city. There is a direct meaningful relation between population density and municipal services distribution in the areas of Ardebil City.

### **Methodology**

The present research is an analytic-descriptive research with information collected in a field and attributive method, via a quantitative research. The statistical society of the research is 44 areas of Ardebil, using 17 indexes, and the collected information is analyzed via VIKOR model. We have used questionnaire by experts to determine the weight of research indexes (20 experts and specialists of municipal service department). We also used AHP model and relative Entropy method to analyze population.

### **Results and Discussion**

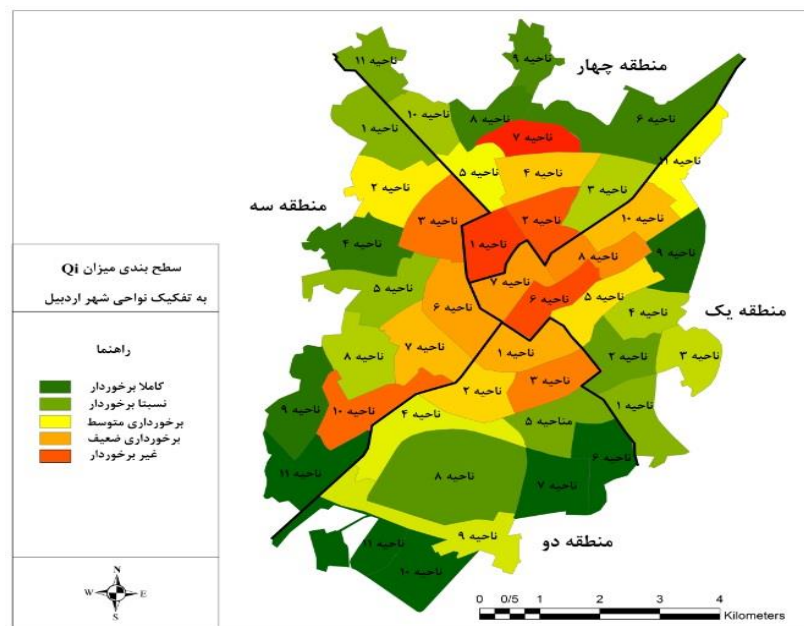
In order to analyze the properties of population spatial distribution in 44 regions of Ardebil, relative Entropy coefficient has been used. The Entropy coefficient in 2014 equals to 0.99. This value is merely less than unity and shows there is almost a full balance in spatial distribution of population.

Investigation on the pearson correlation coefficient between population of the areas in SPSS reveals the value of -0.169 with significance equal to 0.272, which means there is no meaningful relation between the two variables. In fact, population acceptance of different areas of Ardebil is not in accordance with the areas and other factors like land and house price, personal income and etc. have affected the population distribution.

### **VIKOR method**

VIKOR method is one of the newest methods of multi-variable decision making problem solving methods, which was first introduced by Oprikovich & Tzeng in 1998. This method evaluates the problems containing inappropriate and incompatible criteria.

The stages of VIKOR method are presented: First stage: gathering necessary data and forming decision matrix. Second stage: descaling decision matrix. Third stage: determining weight vector of criteria. Fourth stage: determining the best and the worst value among the values of each criterion. Fifth stage: calculating S and R values. Sixth stage: calculating Q. Seventh stage: ranking the options based on the descending order of the obtained values for S, R, and Q.



Checking Pearson's correlation relation between population density and the scores obtained from VIKOR method shows that correlation coefficient is 0.161 and has a meaningfulness level of 0.295. This means there is no meaningful relation between population density and services distribution, i.e. regarding equality, the more the areas obtained the higher ranks in municipal services distribution. This is the same for area of the regions. Correlation coefficient between area of the regions and services distribution equals -0.142. This means that areas extent has no effect on how optimal are the municipal services distribution.

### Conclusion

In this research, spatial distribution of population and services in 44 regions of Ardebil City has been investigated. Density level of Ardebil city in 2014 is 83.6 people per hectare. The highest densities among the areas of Ardebil city belongs to district 7 of region 4 and district 1 of region 3 with 201.1 and 182.2 people per hectare, respectively. The lowest densities belong to district 11 of region 2 and district 8 of region 2 with 0.2 and 1.6 people per hectare, respectively.

The results of this research show that districts 6 and 7 of region 2 with the highest score (very wealthy) and district 7 of region 4 with the lowest score (very deprived), are ranked in the first and the last place, respectively. The results also show that services distribution in some indexes like cultural, kindergarten, fire station and etc. are not distributed equally in regions of Ardebil city. Thus, regarding the first question and assumption, services distribution among the regions are not balanced, which verifies the first assumption. Regarding the second question and considering the results, the Pearson's coefficient between the areas' population rank and rank of VIKOR's score equals 0.151 with meaningfulness level of 0.386. This shows level of population has not affected how the municipal services are distributed. Therefore, there is a mere relation between population scattering and services distribution in the areas of Ardebil city, which rejects the second assumption. According to findings of this research and with the aim of answering the third question, the Pearson's coefficient between areas' population scattering and rank of VIKOR's score equals to 0.161 with a meaningfulness level of 0.295. This means that there is no meaningful relation between population scattering and services distribution. This means that services distribution is not in accordance with population needs, but socio-economic properties of areas' residents have an effect on scattering and distribution of services, so the third assumption is also rejected.

**Keywords:** Ardabil City, services distribution, spatial population distribution, vikor model.

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