The Spatial Analysis of Educational Competitiveness of Iran Provinces

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Abstract: Today, competitiveness has become one of the most applied concepts in regional and urban studies. The reason, why much attention has been devoted to this concept is the changes in the world economy, demographical changes of countries, changes in social structures and activities. This research aimed to conduct a spatial analysis of competitiveness of Iran provinces based on educational factors. In terms of scope, this research is an applied study and in terms of nature and research method is descriptive analytic one. 75 factor from education section of national population and housing consensus of 1390 (2011) have selected and analyzed. For analyzing Coefficient of Variant (C.V), VIKOR and geographically weighted regression in the Arc GIS were used. The research findings indicate inappropriate distribution in the educational factors between provinces of Iran. Totally, 46% of educational factors distributed in unsuitable way, and Sistan and Baluchestan, Kurdistan and Ilam provinces are in most inequality but in turn, West Azerbaijan, Isfahan and East Azerbaijan are in the good situation. Final results shows that, in terms of educational competitiveness, Tehran province is in the first level, Razavi Khorasan, Khuzestan, Fars, Isfahan, East Azerbaijan, Kerman, Mazanderan provinces are placed in the second level, and in the third level Gilan, Sistan and Baluchestan, West Azerbaijan, Lorestan, Hormozgan, Golestan, Kermanshah, Hamadan, Markazi, Kurdistan, Alborz, Qazvin, Ardebil, Kohgiluyeh and Boyer-Ahmad, Boushehr, Yazd, Chaharmahal and Bakhtiari, Zanjan, Semnan, South Khorasan, Qom, Ilam and North Khorasan provinces are located. Overall conclusions indicate that development situations of Iran provinces in terms of educational factors are not in good consistent with concepts of social and spatial justice and required bottom-up approach and decentralized planning. Moreover, economic growth depends on establishment of performance-oriented education system.

Keywords: Spatial analysis, competitiveness, Education, Iran provinces

JEL Classification: R13, I21, F12, H75

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1-Introduction

From many years ago, education has been determined as one of the main bases of economic and social development. However, in recent years, due to technological advances and new method of production that changed economic systems and their relations, education obtained important role in development process. In fact, invention and application of new technologies depend on well-educated and mindset flexible labors. This shows the necessities of more investment in education (Yazdani et al, 2013). Todays, competitiveness has become one of more used concepts of urban and regional studies. The cause of too much attention to this concept is changes in the world economy, nations demographic, social structures and activities (WEF, 2014). The study of competitiveness is necessary for any nation to access to its development goals that has drawn. This concept indicates the skill to compete, the ability to gain and permanently maintain position in cities and regional competitions which is indicated by successfulness and the ability to succeed. Storper defines economical competitiveness of regions and cities as 'the ability of an (urban) economy to attract and maintain firms with stable or rising market shares in an activity while maintaining or increasing standards of living for those who participate in it. Also, the European competitiveness reports defines this concept: 'competitiveness is understood to mean a sustained rise in the standards of living of a nation or region and as low a level of involuntary unemployment as possible. Aiginger (2006) defines competitiveness as '…the ability of a country or location to create welfare' (Lengyel, 2016). This concept is conductible in different geographical levels from micro to macro. Urban competitiveness authors (Bovaird, 1993, Chesihre, Kresl, 1992, Lever, 1993, Meijer, 1993, Cheshire, Gordon, 1998, Sinkiene, 2008, Paliulis, Cincikaite, 2011, Bruneckiene, Guzavicius, Cincikaite, 2010, Kresl, Singh, 2012) emphasize that cities are competing to attract investment, population, labor, funds, tourists and so on. Thus, the city's competitiveness includes the conditions that make a city or region attractive toward its competetators (Cibinskiene, Snieskiene, & Rqhodlþlrj, 2015). Also, Educational competitiveness indicates the ability of a city or region to make it attractive towards educational labors and education applicants. Policy makers and regional activists are relentlessly seeking forms and arrangements for increasing social and economic prosperity of their cities and regions. Many studies suggest that the prosperity of a place is directly related to its competitiveness. Therefore, it cannot be said that other criteria have no role in the competitiveness. Education is one of fundamental indices of development especially human development that can effective role in the increasing cities and regional competitiveness (Alberti & Giusti, 2012).

In the perspective document of Iran (1404) different roles considered for cities in the regional, national, transnational and international level have been determined. Thus, the measurement of competitiveness is one of ways for assessing prosperity in this context. By assessing competitiveness, we can measure the condition of cities from view of social and economic situation. Therefore, this research follows contributing to this concept in the national level. In a world that cities continually entering to global arena and increasingly influencing from global situation, it is necessary to determine the conditions of cities and

regions in regional, national level and for entering to transnational and international arena, measurement of competitiveness is necessary, although this concept requires more empirical and conceptual studies. Therefore authors in this research present the following questions:

- How is the present situation of education factors distribution among Iran provinces?

- How is the educational competitiveness of Iran provinces?

- Are there any significant relationship between population and educational factors distribution among Iran provinces?

2- Literature Review

a) Foreign Researches

Parakhina et al., (2017) studied strategic management in the universities as a competitiveness factor. The results indicate that the important issue of universities competitiveness in Russia is the lack of flexible strategies .

Krskova & Baumann (2017) in their research followed factor combination in regarding to school discipline and education investments. Results indicate that school discipline and education investments affect competitiveness with association being mediated by educational performance that significantly associated with competitiveness directly.

Hurriyati et al., (2017) in their research examined the innovative QDF and KANO strategies in purpose of improving competitiveness in Pendidkan university of Indonesia. Findings indicate that the development model of QFD and resources affect the university strategic orientation, capability knowledge, create value and competitiveness in the university.

Choi & Lee (2015) examined the effective factors in the competitiveness of OECD countries. Results suggest that each country should endeavor to enhance its own educational competitiveness, considering how the factors associated with this relate to each other.

Mainardes et al., (2011) examined the advantage of competitiveness application in higher education institutions. Findings indicate that for being competitive, higher institutions should have a stronger connection between resources, territory, and stakeholders.

Leem & Lim (2007) studied the status of e-learning and strategies to enhance education competitiveness in Korean higher education. Results indicate the lack of support systems and opportunities to actively participate in e-learning programs. Finally, the strategies of competitiveness development for e-learning were proposed.

b) Iranian Researches

Evaluating the researches inside Iran shows that, there is no study about educational competitiveness, thus some related researches about competitiveness have been assessed.

Shirkhani & Khalf-rezaie (2015) studied social capital and competitiveness in the international system. Finding shows significant relationship between social capital factors and competitiveness.

Sharifzadeghan & Tousi (2015) assessed Iran spatial development of regional competitiveness. Results indicate that a scientific and cultural activity through being cluster is the effective propulsion to obtain to the regional competitiveness in Iran.

Zenozi & Esmaeili (2014) assessed the role of government in the competitiveness. Findings show long-term effects of government on the currency competitiveness.

Shahabadi & Sadeghi (2011) studied the competitiveness situation of OPEC countries with focus on innovative

factors. Results show unsuitable situation of OPECT countries competitiveness.

Rahman-seresht & Safaeian (2011) assessed industrial competitiveness of Iran. Results indicate the effective role of Industry size variable in the competitiveness of product industries of Iran.

The results of a study by Totounchian & Mina (2009) suggest a focus on the necessity of increasing professional and technical training in Iran in order to increase competitiveness.

3-Theoritical Framework

Competitiveness

Competitiveness is inextricably linked to the notion of competition, expressing, overall, the capacity of persons, companies, economies or regions to maintain themselves in the local or international competition and to benefit from it. Competitiveness means productivity, seen as added value. It has a dynamic character, forcing companies to give up inertia and foster innovation (Gabor et al, 2012). The concept of competitiveness refers to the ability of a nation to effectively use its resources– whether natural, human or capital (Baumann & Winzar, 2016).

The first important study of competitiveness was that of a research symposium sponsored by the Harvard Business School in 1985. In the book that resulted from the symposium, did two things that set the tone for much of what followed: 1) he wrote on competitiveness at the level of the nation and 2) he asserted that a rising standard of living was the primary indicator of a competitive nation. The variety of definitions and measurements of competitiveness are seen from a study of Parkinson, Hutchins, Simmie, Clark and Verdonk. What is important in the competitiveness is the spirit of competitiveness.

The Oxford Compact English Dictionary defines competitiveness as "having a strong urge to win" (Oxford compact English Dictionary). When planners and consultants speak of competitiveness they tend to accept an externally defined goal of the competitive activity and orient all policies and resources toward meeting that objective. They tend to measure their performance against that of others and often generate a ranking system between cities. Competition among cities goes back to the ancient world and certainly to the trading city states of the 16th Century. Cities such as New York, Philadelphia and Baltimore, in the United States, all competed to gain access to the westward expansion of the country. Barcelona, Marseille and Genoa competed to be the primary European Mediterranean port. However, as the 20th century progressed, goods became more standardized, transportation costs and shipping time both fell, technological advances reduced price and cities began to bump up against one another. Internationalization and integration of markets greatly increased explicit competition among cities (WEF, 2014).

The competitiveness of Megalopolises shows the ability of destination for absorbing social, economic factors, in other words, maintaining and improving its situation along time. According to European idea (1999), the concept of competitiveness relate to the ability of companies, industries, regions, nations and transnational regions for producing in order to transmit to international competitiveness, higher income and employment. Various factors are involved in the competitiveness from social, economic sections including human capital, technology,

sustainability, innovation, and economic growth (Peng & Zhanxin, 2011).

With the accelerating process of urbanization, it becomes an important task to improve the competitiveness of the city itself for social and economic development. Today, it is understood that regions may place their competitiveness based on various social, economic, cultural and environmental aspects. For example, Barcelona, Toronto, Berlin, Bilbao, Glasgow, Denver, and St. Petersburg are examples of this claim. These cities are trying in tourism competitiveness. Countries like USA, England, France and Australia are competing in Student attraction (Singhal, et al., 2013).

It should be noted that, the competitiveness index is an important tool in evaluation of the overall economic stability of the country. The positive impact of human capital on productivity, poverty and health has been demonstrated by many studies in the literature. Studies supported by World Bank have demonstrated that an additional year of primary education increases labor productivity by 10-30%. Another research using data on thirteen low income countries shows that postsecondary education increases farm production by eight percent. In addition, a 10% increase in girls' enrollment in primary education leads to a substantial decrease in infant mortality (4.1 deaths per 1000). Finally, the high enrollment in primary education is one of the most effective ways to reduce poverty in developing countries. Thus, it is important to have a better understanding of education role in the development of countries. So that, education is considered as important tool to fight poverty and eliminate gender inequality, raise labor productivity and competitiveness of economy (Salahodjaev, 2013).

The Harvard-based Barro School investigated the neoclassical model that suggests a convergence of poor economies attempting to catch up to the more developed nations. Roughly 100 countries were observed from 1960 to 1995 on years of schooling and quality of education, and the results suggested that, overall, economic growth is positively related to education, and, quite possibly, vice versa. A prime example is South Korea. One of the key factors leading to Korea's rise from a developing country to an emerging market and eventually Organization for Economic Co-operation and Development (OECD) member has been its performance-oriented education system. The OECD tested the data from its PISA study (Program for International Student Assessment) for the effect of education on economic growth and found a strong correlation between the two (Baumann & Hamin, 2011).

Globalization, rising costs of public services in general and the evolution of the knowledge-based economy have caused dramatic changes to the character and functions of higher education in many countries. Higher education systems in both Europe and Asia have recently been going through significant restructuring processes to enhance their competitiveness and hierarchical positioning within their own countries and in the global market (Deem et al., 2008).

National and international educational ranking system reveals the importance of education. In regard to literature review, the role of education in the economic growth is clear. So, education is the foundation of economic growth of country. Thus, having good understanding of educational competitiveness is necessary and requires real attention to this section.

4- Research Method

This research, regarding the goal is an applied study and from view of nature and research method, it is a descriptive analytic one. Required criteria were selected from education section of last national housing and population consensus (2010). Then, coefficient of variation (C.V) was used to determine the distribution of education indices in the provinces of the country.

After determining the weight of the selected indexes based on the Shannon entropy model, VIKOR multi-criteria decision-making methods were used rank to competitiveness of Iran provinces. Finally, in order to investigate significance the relationship between population and educational indices distribution GWR were used. Figure 1 shows the process of the research.
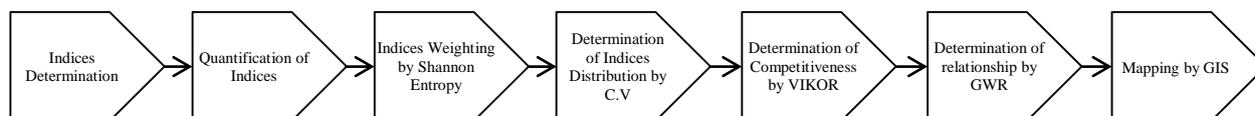

Fig1. The process of spatial analysis of educational competitiveness of Iran provinces

Table 1 shows the indices that were used in the research. 75 indicators from last national housing and population census were selected and after coding by using Shannon entropy were weighted.

Table1. Criteria and Indices of Research

Code	Indices	Criteria
X1	Population (N)	Total population of province
X2	Literacy rate	Total Literacy rate of province
X3		Urban literacy rate
X4		Village literacy rate
X5	School Students (N)	Exceptional students
X6		Pre-school students
X7		Elemantary students
X8		Middle students
X9		Secondary students
X10		Pre-university students
X11		Old Middle students
X12		Old Secondary students
X13		Old Pre-university students
X14	Educational staffs	Excepetional education staffs
X15		Elemantary education staffs
X16		Middle education staffs
X17		Secondary education staffs
X18	Offic staffs	Excepetional school office staffs
X19		Elemantary school office staffs
X20		Middle school office staffs
X21		Secondary school office staffs
X22	Educational facilities-School	Exceptional
X23		Pre-school
X24		Elemantary
X25		Middle
X26		Secondary
X27		Pre-university
X28		Old middle school

Code	Indices	Criteria
X29		Oldsecondary school
X30		Old Pre-university school
X31	Educational facilities-classroom	Exceptional
X32		Pre-school
X33		Elemantary
X34		Middle
X35		Secondary
X36		Pre-university
X37		Old middle school
X38		Oldsecondary school
X39		Old Pre-university school
X40	Literacy movement and it covering villages	Male instructor of literacy movement
X41		Female instructor of literacy movement
X42		Villagers under cover
X43	Faculty member of National university(N)	Male
X44		Female
X45		Full professor
X46		Asociate professor
X47		Assisstant professor
X48		Tutor
X49		Instructor tutor
X50		Non faculty member univeristy instructor
X51	Faculty member of Islamic Azad University(N)	Male
X52		Female
X53		Full professor
X54		Asociate professor
X55		Assisstant professor
X56		Tutor
X57		Instructor tutor
X58		Non faculty member univeristy instructor
X59	Higher education registeration (N)	National university male students
X60		National university female students
X61		Islamic Azad University male students
X62		Islamic Azad University female students
X63	Students of higher educational centers (N)	National university male students
X64		National university female students
X65		Islamic Azad University male students
X66		Islamic Azad University female students
X67	Graduated of higher educational Centers (N)	National university Male students
X68		National university female students
X69		Islamic Azad University male students
X70		Islamic Azad University female students
X71	Technical and Professional Centers(N)	For males
X72		For females
X73		Male tutors
X74		Female tutors
X75		Trained number

Reference :(Statistical Center of Iran)

Techniques
Shannon Entropy

Shannon and Weaver introduced this method in 1974. Entropy expresses the amount of uncertainty in a continuous probability distribution. The main idea of this method is that, the more dispersion of indicator is, the more the indicator is important (Zarabi et al., 2011). This technique includes following stages:

- Formation of decision matrix: decision matrix or whitening matrix is M option based on n criteria.

- Calculation of decision matrix content by:

$$P_{ij} = \frac{x_{ij}}{\sum\limits_{i=1}^{m} X_{ij}}$$

- Determination of Ej value:

$$-\frac{1}{Lnm}\sum\limits_{i=1}^{m} P_{ij} Ln(P_{ij})$$

- Determination of diversion of each criterion (dj) by fraction Ej value from 1

- Determination of each criteria weight by:

$$W_j = \frac{d_J}{\sum\limits_{i=1}^{n} d_i}$$

Coefficient of Variation (C.V)

This method shows the distribution of data in a geographical area, and was used to compare two or more things. The high value of coefficient reveals the inequality in dispersion of indices. In the following formula, S is standard deviation and M is average.

$$CV = \frac{S}{M}$$

VIKOR

The VIKOR method was developed for multi criteria optimization of complex systems. It determines the compromise ranking-list, the compromise solution, and the weight stability intervals for preference stability of the compromise solution obtained with the initial (given) weights. It introduces the multi criteria ranking index based on the particular measure of ''close- ness'' to the ''ideal'' solution. The compromise ranking algorithm VIKOR has the following steps:

- Formation of decision matrix: decision matrix or whitening matrix is M option based on n criteria.

- Data normalization:

$$f_{ij} = \frac{X_{ij}}{\sqrt{\sum\limits_{i=1}^{n} X_{ij}^2}}, i = 1,2,...,m; \quad j = 1,2,....,n$$

That Xij is the value of each criteria and fij is the normalized value of i and j.

- Weighting of normal matrix: in this research Shannon entropy was used to Weighting the criteria's that are represented in table 2.

- Determine the positive and negative ideal for each criteria: determine the best and the worst values between all criterion, and call f+ and f -. If criterion represent benefit then:

$$f^- = \min f_{ij} \quad, f^+ = \max f_{ij}$$

If criterion represent disadvantage then:

$$f^- = \max f_{ij} \quad, f^+ = \min f_{ij}$$

- Compute the values Sj and Rj;

$$S_j = \sum\limits_{i=1}^{n} w_i \left[\frac{f_i^+ - f_{ij}}{f_i^+ - f_i^-}\right]; R_j = \max_i \left[w_i\left(\frac{f_i^+ - f_{ij}}{f_i^+ - f_i^-}\right)\right]$$

- Compute the values Q by the relations:

$$Q_i = v\left[\frac{S_J - S^-}{S^+ - S^-}\right] + (1 - V)\left[\frac{R_J - R^-}{R^+ - R^-}\right]$$

- Compute the values Q for each criterion: criterion that has the least value is in priority.

$$S^- = Max\, S_i, S^+ = Min\, S_i$$
$$R^+ = Min\, R_i, R^- = Max\, R_i$$

Two final condition of decision making by VIKOR technique: Rank the alternatives, sorting by the values S, R and Q, in decreasing order. The best alternative is that if the following two conditions are satisfied:

- C1: if criterion A1 and A2 between m criterion have the first and second order. The following relations should be satisfied:

$$Q(A_2) - Q(A_1) \geq \frac{1}{m-1}$$

- C2: Alternative A1 must also be the best ranked by S or/and R. If C1 not satisfied, both criteria are best. If C2 not

satisfied, A1 and A2 both should be selected as the best criteria.

Geographically Weighted Regression (GWR)

Geographically Weighted Regression (GWR) is the developed form of general regression framework. Its main origin is following:

$$y_i = \beta o\left(u_i, v_i\right) + \sum \beta_k \left(u_i, v_i\right) X_{ik} + \epsilon_i \quad i = 1, 2, \ldots, n$$

where parameters of (v_i, u_i) is the coordinate of i point in space, $\beta_k \left(u_i, v_i\right)$ is a continues function of $k\left(u, v\right)\beta$ in each point of $i,$ is descriptive variables in point $i,$

$x_{i1}, \ldots x_{ip}$ and is error. For set of data of regional parameters $k\left(u, v\right)\beta$ by using steps of weighted squares are estimated. Weights of w_{ij} for i=1,2,...,n in any position $\left(v_i, u_i\right)$ as continues relation from distances between i point and other points are obtained (C. Li, Li, Wu, & Cheng, 2017).

5-Research Findings

To determine the relative importance of criteria Shannon entropy were used. Obtained weights are represented in table 2.

Table2. Relative Weights of criteria

Code	Weight	Code	Weight	Code	Weight	Code	Weight	Code	Weight
X1	0.0129	X16	0.0120	X31	0.0124	X46	0.0187	X61	0.0136
X2	0.0102	X17	0.0123	X32	0.0129	X47	0.0151	X62	0.0149
X3	0.0102	X18	0.0125	X33	0.0123	X48	0.0126	X63	0.0127
X4	0.0102	X19	0.0125	X34	0.0124	X49	0.0154	X64	0.0127
X5	0.0126	X20	0.0122	X35	0.0126	X50	0.0121	X65	0.0132
X6	0.0125	X21	0.0121	X36	0.0126	X51	0.0131	X66	0.0146
X7	0.0127	X22	0.0119	X37	0.0136	X52	0.0146	X67	0.0131
X8	0.0129	X23	0.0126	X38	0.0126	X53	0.0195	X68	0.0130
X9	0.0128	X24	0.0118	X39	0.0126	X54	0.0195	X69	0.0130
X10	0.0128	X25	0.0119	X40	0.0187	X55	0.0150	X70	0.0146
X11	0.0139	X26	0.0120	X41	0.0199	X56	0.0137	X71	0.0123
X12	0.0129	X27	0.0123	X42	0.0140	X57	0.0135	X72	0.0130
X13	0.0127	X28	0.0128	X43	0.0127	X58	0.0137	X73	0.0119
X14	0.0121	X29	0.0121	X44	0.0127	X59	0.0128	X74	0.0126
X15	0.0121	X30	0.0125	X45	0.0220	X60	0.0129	X75	0.0115

To determine the situation of indices, dispersions through provinces, C.V were used. Based on table 3, 20 indicator have values more than 1 and 36 indices have values more than 0.9 that indicate the unequal dispersion of educational indices through provinces. The highest inequality are between x45(national university Full Professor), x54 (Islamic Azad University assistant professor) and x53 (Islamic Azad

University associate professor) respectively with scores 2.566, 2.273 and 2.211. In turn, least inequality is between indices x3(urban literacy rate), x2 (total province literacy rate) and x4 (village literacy rate) respectively with scores 0.030, 0.046 and 0.057. Totally, between 48 % of studied indicators, have values more than 0.9 that indicate high level of inequality of indices dispersion through provinces.

Table3. C.V Scores of educational indices

Code	Score	Code	Score	Code	Score	Code	Score	Code	Score
X1	0.946	X16	0.724	X31	0.814	X46	2.134	X61	1.141
X2	0.046	X17	0.793	X32	0.890	X47	1.575	X62	1.494
X3	0.030	X18	0.842	X33	0.770	X48	0.890	X63	0.974
X4	0.057	X19	0.827	X34	0.823	X49	1.327	X64	0.942
X5	0.856	X20	0.764	X35	0.877	X50	0.765	X65	1.016
X6	0.822	X21	0.736	X36	0.880	X51	1.010	X66	1.378
X7	0.881	X22	0.705	X37	1.007	X52	1.335	X67	0.985
X8	0.930	X23	0.823	X38	0.843	X53	2.211	X68	0.980
X9	0.936	X24	0.622	X39	0.776	X54	2.273	X69	0.903
X10	0.926	X25	0.668	X40	1.913	X55	1.481	X70	1.307
X11	1.051	X26	0.713	X41	1.963	X56	1.072	X71	0.754
X12	0.928	X27	0.797	X42	0.991	X57	0.990	X72	0.871
X13	0.789	X28	0.873	X43	0.966	X58	1.090	X73	0.660
X14	0.752	X29	0.721	X44	0.906	X59	0.992	X74	0.898
X15	0.723	X30	0.760	X45	2.566	X60	0.996	X75	0.599

Figure 2 shows the distribution chart of educational indices through Iran provinces. The outward direction of chart and more than 0.9 indicate unequal distribution of educational indicators between Iran provinces.
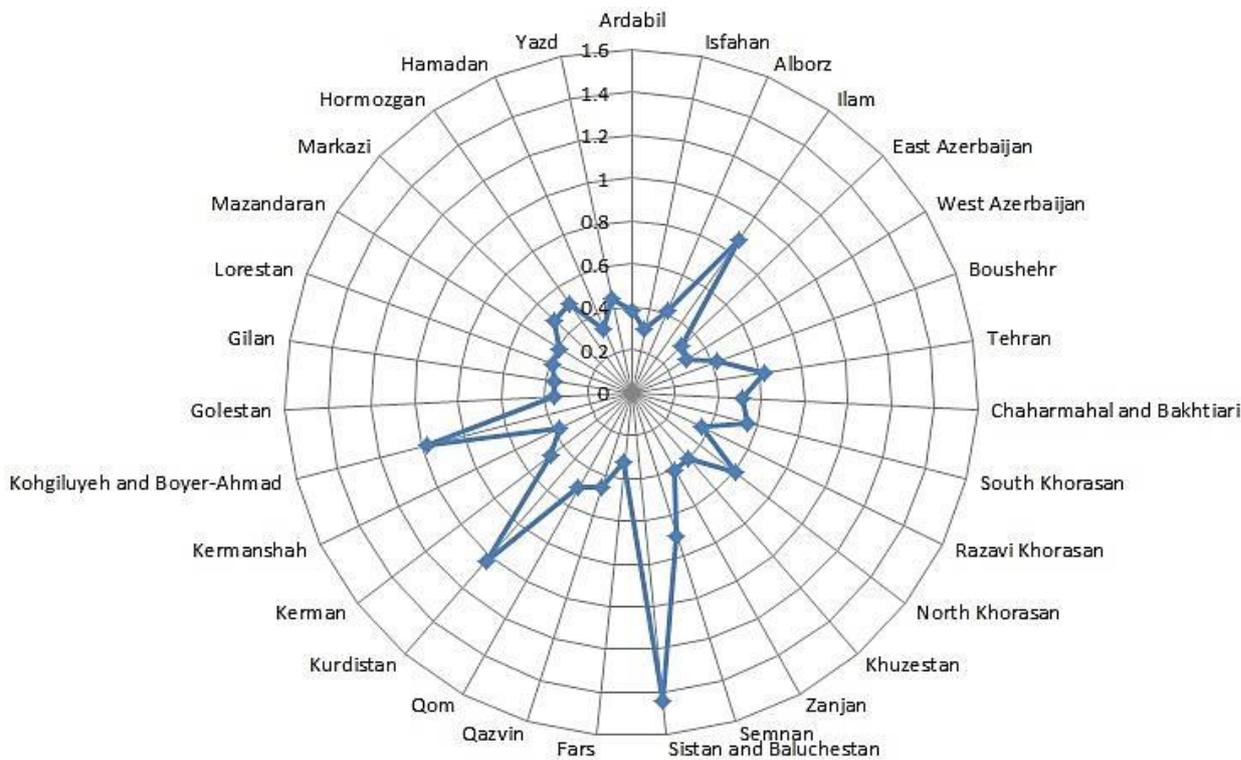

Fig2. Distribution of educational indicators through Iran provinces

Table 4 shows the scores of C.V model for each province. The highest level of inequality of educational indicators is between Sistan and Baluchestan, Kurdistan and Kohgiluyeh and Boyer-Ahmad with

scores 1.43, 1.03 and 0.975 respectively. In contrast, the least inequality is between west Azerbaijan, Isfahan and east Azerbaijan province with scores 0.301, 0.303 and 0.314.

Table 4. C.V scores of Provinces

R	Province Name	Score	R	Province Name	Score
1	East Azerbaijan	0.314	17	Fars	0.321
2	West Azerbaijan	0.301	18	Qazvin	0.456
3	Ardabil	0.381	19	Qom	0.501
4	Isfahan	0.303	20	Kurdistan	1.03
5	Alborz	0.419	21	Kerman	0.472
6	Ilam	0.866	22	Kermanshah	0.368
7	Boushehr	0.421	23	Kohgiluyeh and Boyer-Ahmad	0.975
8	Tehran	0.619	24	Golestan	0.354
9	Chaharmahal and Bakhtiari	0.509	25	Gilan	0.359
10	South Khorasan	0.555	26	Lorestan	0.391
11	Razavi Khorasan	0.359	27	Mazandaran	0.389
12	North Khorasan	0.607	28	Markazi	0.490
13	Khuzestan	0.398	29	Hormozgan	0.5
14	Zanjan	0.410	30	Hamadan	0.322
15	Semnan	0.696	31	Yazd	0.45
16	Sistan and Baluchestan	1.43	-	-	-

In order to answer to the second question of the study VIKOR, model was used. The results of are represented in table 5. Q average for 31 provinces is 0.38 that is less than average limit. As showed in table 5, Tehran with Q score of -0.0009 in the highest level and Razavi Khorasan and Khuzestan with Q scores 0.2500 and 0.2679 respectively placed in second and third rank. In contrast, North Khorasan with Q score 0.4581 is in the least rank. Ilam and Qom with scores 0.4561 and 0.4559 are respectively in the

second to third rank of the most deprived provinces. Therefore, with focus on results, the conditions were tested:

A1 and A2 are respectively the first and second alternatives and DQ=1/(31-1) and i is the number of alternatives. DQ=1/(31-1)=03.0 and Q (A(2))- Q (A(1))≥0.25, as regards Q score for second alternative was 0.2500 and for first alternative was -0.0009, fraction of two score is 0.25 that is larger than DQ value. Thus, the first condition confirmed.

Table5. Scores of VIKOR model for provinces

Province Name	R	Province Name	S	Province Name	Q
Tehran	0.01792	Razavi Khorasan	0.0904	Tehran	-0.0009
Razavi Khorasan	0.01799	Tehran	0.4961	Razavi Khorasan	0.2500
Khuzestan	0.01887	Isfahan	0.5536	Khuzestan	0.2679
Fars	0.01899	East Azerbaijan	0.5694	Fars	0.2712
Isfahan	0.01903	Fars	0.5737	Isfahan	0.2856
East Azerbaijan	0.01937	Alborz	0.6058	East Azerbaijan	0.3038
Kerman	0.01995	West Azerbaijan	0.6798	Kerman	0.3365
Mazandaran	0.02000	Kerman	0.6990	Mazandaran	0.3480
Gilan	0.02003	Mazandaran	0.7435	Gilan	0.3650
Sistan and Baluchestan	0.02004	Khuzestan	0.7546	Sistan and Baluchestan	0.3776
West Azerbaijan	0.02047	Hamadan	0.7655	West Azerbaijan	0.3832
Lorestan	0.02074	Semnan	0.7990	Lorestan	0.3961
Hormozgan	0.02084	Gilan	0.8099	Hormozgan	0.4043
Golestan	0.02088	Qom	0.8128	Golestan	0.4165
Kermanshah	0.02089	Kermanshah	0.8272	Kermanshah	0.4195
Hamadan	0.02092	Sistan and Baluchestan	0.8303	Hamadan	0.4213
Markazi	0.02092	Yazd	0.8331	Markazi	0.4231
Kurdistan	0.02093	Zanjan	0.8424	Kurdistan	0.4243
Alborz	0.02099	Golestan	0.8469	Alborz	0.4247
Qazvin	0.02105	Chaharmahal and Bakhtiari	0.8486	Qazvin	0.4270
Ardabil	0.02105	Qazvin	0.8541	Ardabil	0.4292
Kohgiluyeh and Boyer-Ahmad	0.02105	Markazi	0.8696	Kohgiluyeh and Boyer-Ahmad	0.4398
Boushehr	0.02108	Lorestan	0.8720	Boushehr	0.4415
Yazd	0.02111	Hormozgan	0.8740	Yazd	0.4417
Chaharmahal and Bakhtiari	0.02113	South Khorasan	0.8770	Chaharmahal and Bakhtiari	0.4445
Zanjan	0.02114	Ardabil	0.8775	Zanjan	0.4469
Semnan	0.02114	Boushehr	0.8782	Semnan	0.4488
South Khorasan	0.02118	Kurdistan	0.8919	South Khorasan	0.4545
Qom	0.02118	Kohgiluyeh and Boyer-Ahmad	0.8948	Qom	0.4559
Ilam	0.02119	Ilam	0.8987	Ilam	0.4561
North Khorasan	0.02119	North Khorasan	0.9020	North Khorasan	0.4581

By using VIKOR results, the competitiveness of Iran provinces were divided into three levels of high, moderate and low competitiveness. Figure 3 shows the competitiveness of Iran provinces based on educational indices. At First level, which shows the highest level of competitiveness in black color, only

Tehran is located. Khorasan Razavi, Khuzestan, Fars, Isfahan, East Azerbaijan and Mazandaran are placed in second level with gray color. Gilan, Sistan and Baluchestan, West Azerbaijan, Lorestan, Hormozgan, Golestan, Kermanshah, Hamadan, Markazi, Kurdistan, Alborz, Qazvin, Ardabil, Kohgiluyeh and

Kohgiluyeh and Boyer-Ahmad, Boushehr, Yazd, Chaharmahal and Bakhtiari, Zanjan, Semnan, South Khorasan, Qom, Ilam and

North Khorasan are placed in the low competitiveness level.

Fig3. Ranking the competitiveness of provinces based on educational indices

Table 6 shows educational competitiveness of provinces respectively. One province in first level, 7 provinces in second level,

and 23 provinces are placed in third level. Overall, more than 67 % of provinces are in low level of educational competitiveness.

Table6. The educational competitiveness level of Iran provinces

R	Province Name	N	Level
1	Tehran	1	High
2	Razavi Khorasan, Khuzestan, Fars, Isfahan, East Azerbaijan, Kerman, Mazandaran	7	Moderate
3	Gilan, Sistan and Baluchestan, West Azerbaijan, Lorestan, Hormozgan, Golestan, Kermanshah, Hamadan, Markazi, Kurdistan, Alborz, Qazvin, Ardabil, Kohgiluyeh and Boyer-Ahmad, Boushehr, Yazd, Chaharmahal and Bakhtiari, Zanjan, Semnan, South Khorasan, Qom, Ilam,North Khorasan	23	Low

To determine the relationship between population and educational indices, GWR model was used in Arc GIS software

environment. The results of GWR revealed that the highest level of effectiveness in first level is to Alborz and west Azerbaijan,

In second level, is to Razavi Khorasan, North Khorasan, Tehran, Qom, Hamadan, Kermanshah and Zanjan and in third level is to Sistan and Baluchestan, Boushehr, Yazd, South Khorasan, Isfahan, Chaharmahal and Bakhtiari, Ilam, Markazi, Semnan, Golestan, Qazvin, Kurdistan and Ardabil, and in fourth level to Hormozgan, Fars, Kohgiluyeh and Boyer-Ahmad, Lorestan, Mazandaran, Gilan and finally in the lowest place Kerman, Khuzestan and East Azerbaijan are placed.
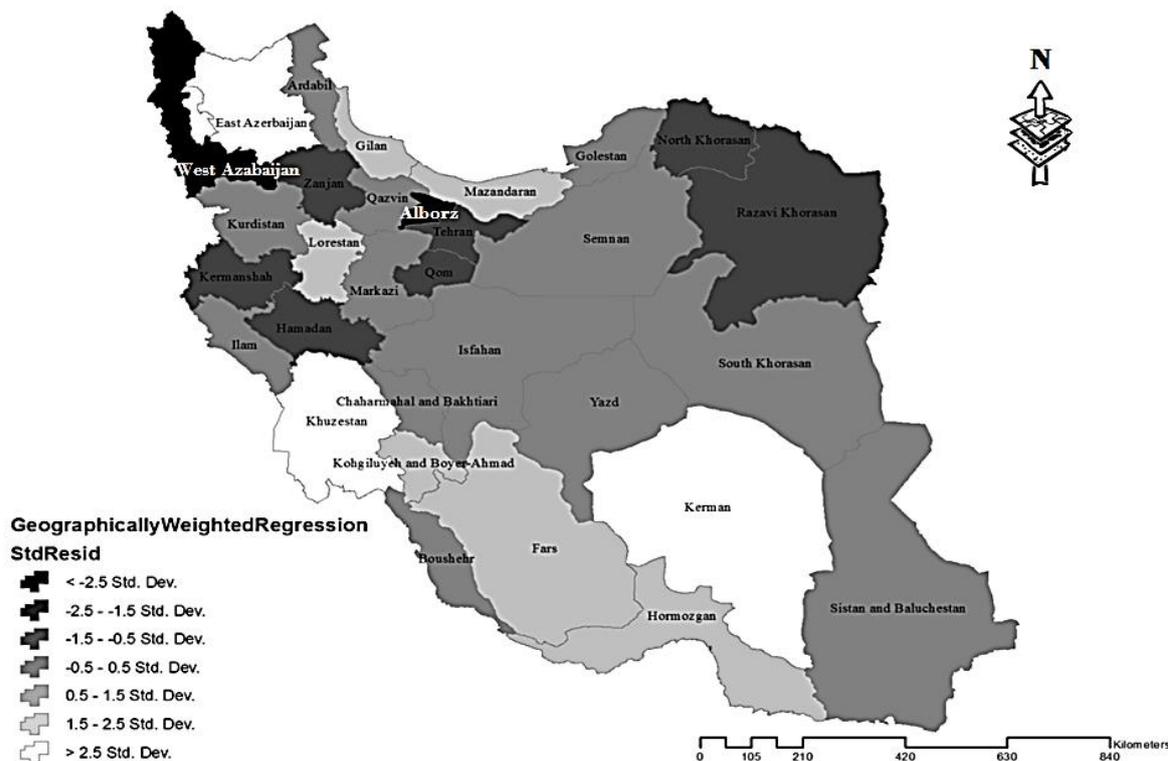

Fig4. The results of GWR

6- Conclusion and Discussion

Since the start of globalization, cities efforts to gain a position in global arena have begun. Each of them is in seeking of profession and introducing themselves in local, regional, transnational level. Also, the socio-economic and cultural foundation of each country depends on education. Present research aimed at obtaining to equal development in the field of education in order to recognize and assess distribution of educational factors between provinces. To achieve this coefficient of variation, VIKOR, and GWR for analyzing indices and determining competitiveness of provinces were used.

Based on statistical analysis in first stage, 26 % of indices (scores more than 1), and in second stage 48% of indices (scores more than 0.9) distributed unequally between provinces. Overall assessing shows that Iran provinces do not have a good status in terms of educational indicators. Concentrated policies and planning have effective role in this spatial inequality. Increasing uneven distribution of education indicators leads to the lack of deprived areas of these facilities. Ultimately, this leads to regional and spatial inequalities. In order to improve the distribution of education indicators in Iran, it is possible to change the priorities

of allocating resources, facilities and human or material infrastructure in favor of deprived and underdevelopment provinces.

Evaluating the levels of competitiveness of provinces indicate that Tehran is in higher level than others that reveals concentrative planning. Considerable point in the competitiveness of provinces is that new established provinces which are not in a good position.

In general, the results of the survey indicate that the development status of the provinces of the country in terms of educational indicators is not suitable for social and spatial justice, which requires bottom-to-top attention as it is non-programmed.

Today, educational competitiveness should be considered by the policy makers. Using South Korea experience in the field of education could be helpful. All studies about educational competitiveness confirmed the positive and effective role of education on the economic growth. Most of developed nations before being developed economy established the most applicable education systems. Therefore, in Iran, establishment of performance-oriented education systems is felt more than ever.

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