

Spatial Analysis of Urban Inequality in Qazvin Province

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ABSTRACT: As a descriptive-analytical study, this paper aims to investigate and analyze spatial inequalities among different cities of Qazvin province during 1976-2006, using statistical models and software. Regarding population, social, economic, health, cultural, infrastructural, transportation and communicational indicators in 25 cities of Qazvin province, Qazvin, Abgarm, Narje are most developed, and KhakAli, Sagez Abad, Aavaj, Abgarm, Zia Abad, and Sirdan, are deprived cities, respectively. Coefficient of variance model indicates the most inequality belongs to cultural indicator and the least belong to social indicators. Based on the results of the study, economical factor is more effective on spatial structure of all cities in Qazvin. Moreover, infrastructural and cultural factors are influential in cities of the province.

Keywords: Spatial Analysis, Statistical Analysis, Urban Inequality, Qazvin Province

ORIGINAL ARTICLE

INTRODUCTION

Studying social, economic, cultural and health indicators is one of the significant factors in development process. After industrial revolution, increasing capitalism economic influenced remote areas, existing cities merged in new system and their responsibilities changed (Gilbert, 1996). Development inflation and growth density, especially in third world countries, created regional lack of balance and coordination which lead to great migration from rural to urban areas, deprivation of other areas, and regional inequality (Masoumi Ashkouri, 1997). In Iran, influence of different factors and dominance of economic, social, and political structures created inequality and imbalance in optimal distribution of facilities as a result of past impractical policies in industrial and servicing positioning, growing centers and centralization in regional dominant cities, and spatial inequality in national, regional and local levels. Increasing the role of government on economic, planning, centralization and section orientation, increased these abnormality and imbalances. Therefore, public participation decreased and large and small areas were not unified, yet (Movahed, 1997), which results in lack of optimum distribution of resources, wealth and prosperity, destruction of regional equivalences, increasing developmental gap, and destruction of socio-economic justice and regional duality.

However, to solve the problem, developmental planners and designers are required to have a realistic view on the issue to find the cause of regional duality. Hence, the first step of planning is recognizing the current developmental situation in regions to solve inequalities and regional imbalances, and to determine regional development scopes according to facilities and limitations and utilizing extensive facilities of each region. This

study aims to reach a balanced regional development in Qazvin province and to find out situation and distribution method of developmental facilities on selected indicators in cities of this province. To achieve this objective, using statistical techniques and methods, developmental indicators were codified and classified to measure development of each city. However, identifying facility distribution methods help to investigate influential factors in this distribution, development capacities and limitations in cities of Qazvin province, and regional planning. Ultimately, some guidelines are presented to eradicate poverty in underdeveloped cities of Qazvin.

Henceforth, to explain the concept of development, first its dimensions and aspects should be recognized. In this research, development means fundamental changes in socio-economic structure, reducing inequalities, optimal distribution of facilities, establishing justice, and achieving a balance in cities of Qazvin province.

Developmental inequality is one of the issues presented in regional planning, but in Iran its position is not considered, yet. Regional inequalities caused by historical, natural, demographical, social, economic, political, etc. factors, lead to heterogeneous and unbalanced growth of the areas (Mansouri Thaleth, 1996).

Regional inequalities of the province result in geographical inequalities. In general, there is a great difference between socio-economic, cultural, etc. development of the regions. These changes make difference in facilities, services and infrastructures of life style, population density, and prosperity of regions (Mousavi et al., 2004).

In Iran, regional inequalities are mainly caused by previous non-principled policies in industrial and service positioning, growth areas and centralization of regional metropolitan (Hossein Zadeh Dalir, 2001). These regional inequalities in Iran increases gap between improvement of

developed and deprived areas and lose the content of social and economic justice; deprived area continues its deprivation and central areas centralize its facilities. This issue not only prevents growth and development of the country, but makes general developmental process more unjust and slower. Therefore, recognizing different capabilities of deprived areas and their utilization methods, improving developmental potential and enlargement of deprived areas can have significant role on regional balance. Although, pre- and post-revolution plans in Iran were concerned with decreasing inequalities, but based on studies, implementation of these plans didn't decrease severity of inequalities. This issue is mainly caused by lack of accurate recognition of different aspects of inequalities, and inappropriate applicable policies in achieving these objectives. A regional balanced development tries to create the best opportunities and facilities for general development of all regions, and minimize the life quality differences of inter- and intra-regional or remove it (Hossein Zadeh Dalir, 2001). Following regional developmental inequalities of the country, cities of Qazvin province suffer socio-economic, cultural, health, etc. inequalities. Therefore, the current study accurately recognizes various aspects of the current situation and deprived cities of Qazvin, attracts developmental planners and designers to adopt policies and plans to reduce inequalities among cities of the province. In this regard, it is essential to target urban development and recognizing plotted socio-economic justice distribution among cities of Qazvin province to reduce regional inequalities.

REVIEW OF LITERATURE

Unbalanced regional growth during last decades attracts many regional economists. Growth centers, regional duality, decline of big cities, marginalization in the city, public migration and south-north issue approve the idea. Many researches have been carried out in this issue up to now. Researchers concluded there are two forces affecting the issue, one of them leads to distribution of economic activities in different areas of the country and is considered as positive factor in making revenue closer to different areas and results in approximation of life level in different areas of the country. The second factor centralizes activities in specified areas and increases inequalities between different areas (Sabagh Kermani, 2001). In a research "Analysis of Regional Development Inequalities in Iran", Taghvaei et al. (2011), evaluated different indicators using quantitative techniques such as AHP, Topsis, and coefficient of variance, and concluded there are significant inequalities among developmental level of the cities in Iran. Furthermore, Shemiranat, Tehran and Damavand are the most developed cities in central parts of the country. While, marginalized and boundary cities are under-developed and deprived. In the paper "Spatial Analysis of Regional Inequalities in East-Azerbaijan Province", Sarvar et al. (2010) evaluated socio-economic, cultural, etc. indicators and concluded there are developmental differences and inequalities among cities of the province, and classified as: Tabriz and Azarshahr (level one of development), Maragheh, Ahar, Bonab, Marand, Mianeh, Sarab (level two of development),

Shabestar, Oskou, Bostan Abad (level 3 of development), and Jolfa, Kaleibar, Heris, Hashtroud and Malekan (Level 4 of development). To evaluate economic inequality level in Firouz Kouh city, Abou Nouri and Khoushkar (2007) evaluated Gini coefficient and income during 1998-2006. Results of Gini coefficient and evaluation of their process indicated increase of economic inequality during this period, and the minimum and maximum increase belong to 1998 and 2003, respectively. Average inequality during study period was 0.39. In another research "Evaluating Developmental Level of Regions in Iran", Mir Najaf Mousavi (2003) evaluated development of various parts of Iran in 31 specified indicators and classified areas based on different development indicators (socio-economic, cultural, etc.). Results of the study show regional inequality of Iran is along with geographical inequalities. There is a great difference between socio-economic and cultural development and settlements from north-south, west-east, and north-west to south-east and center of the country.

Theoretical principles

In development issue, some studies have carried out as papers or M.A. or PhD thesis. In its report, UN (1991) investigated developmental degree of the countries using three indicators: life expectancy, literacy and per capita income, and concluded many African, South and Central American and Asian countries are in low level of human development and need economic growth (UNDP, 1991). Determining development degree of rural areas of the country in 1986 show improvement compared to 1976. While there is some development in rural areas, regional duality has been intensified in these areas (Eslami, 1993). Investigating regional economic inequality and its relation with Iran economic development indicate regional economic inequality and developmental levels of Iran are due to extrinsic shock such as increasing oil price, changes caused by Islamic Revolution of Iran, and Iran-Iraq war (Shakeri Hossein Abad, 1993). To achieve regional and sustainable development and continuous growth, regional planning based on country preparation is required to recognize natural and human resources of each region (Dehmardeh, 1993). To solve urban inequalities and regional development problems, it is necessary to consider the cities based on the results of the models, effects of each section and ranks of the cities (Mousavi et al., 2010). During 1976-1986, development of cities in Mazandaran province was increasing, and improvement of deprived cities was more than developed cities, that decreased duality of these regions (Borzavian, 1995). Economic development and equitable distribution of economic facilities and resources were the main factors in decreasing regional inequalities (Management and Planning Organization, 2011). Based on the center-surrounding theory, central areas have centralized facilities and are more developed, but in marginalized areas development is decreased. Regional development classification using HDI model and socio-economic indicator emphasize this issue (Klantari, 1998). Inequality and lack of balance in optimal distribution of facilities and resources, and centralization of facilities and services in dominant regional cities result in development gap between regions (Mousavi et al., 2007).

MATERIAL AND METHODS

The current study is an applied-development, descriptive-analytical research. Statistic society includes 25 cities of Qazvin province. 38 socio-economic, cultural and health indicators were investigated, and the data were derived from population and housing statistics and censuses. Using factor analysis method, indicators have decreased and are presented meaningfully in composition with factors. Percentage of contribution of each factor in human development is specified and different cities of Qazvin province were ranked in terms of economic development using TOPSIS model. Ultimately, inequality of cities is recognized using coefficient of variation (CV) formula. To calculate data, Statagraphics, Spss, Excel, and Mintab software were used and ArcGIS software was used for mapping.

RESEARCH INDICATORS

One of the most common criteria emphasized in our research is ranking cities of a region based on development using socio-economic, cultural, health, etc. indicators. In this base, cities are ranked as very high developed, high developed, average developed, low developed and very low developed. This classification is important because understanding development level of cities can indicate life level of population of a city, on the other hand, understanding status of cities, their capacities and limitations can help offering plans to reduce deprivation of those cities. There are various aspects in difference between cities, that is, some of the cities may be developed culturally while other cities are socio-economically deprived, and vice versa, hence, it seems to recognize developmental level and differences between cities. Combined indicators can be used to show life level, welfare and culture of people in each city. In this section, ranking of the cities in Qazvin province is presented in 67 indicator, and 7 parts (1: population, 2: social, 3: economic, 4: health-treatment, 5: cultural, 6: infrastructural facilities and equipment, and 7: transportation and communication) using entropy weighing and TOPSIS method. It explains the role of each factor in human development and developmental level of each city in compound indicators and rank of each city.

Spatial structure of cities in Qazvin province serves as dependent variable comprised of 8 parts, each of which have spatial scale including:

Demographic structure

Indicators studied in this part include 4 population growth indicator (1996-2006) (C1), active population (C2), immigrants' percent to total population (C3), and GDP (C4).

Social structure

The most important indicator studied in this part include percent of male students (C5), female students' percent (C6), literacy of male (C7), literacy of females (C8), and household reverse to house (C9).

Economic structure

Economic structures are the most significant and

influential indicators studied in spatial structure of cities in Qazvin province, and include industry sector professionals (C10), mine sector professionals (C11), service sector professionals (C12), transportation sector professionals (C13), sanitary sector professionals (C14), training sector professionals (C15), employment rate of men (C16), employment rate of women (C17), reverse unemployment rate (C18), industrial sites for thousand people (C19), participation rate of women (C20).

Health-treatment structure

Indicators studied in this section include general hospital for thousand people (C21), clinic for thousand people (C22), pharmacy for thousand people (C23), specialist for thousand people (C24), doctor for thousand people (C25), laboratory for thousand people (C26), rehabilitation center for thousand people (C27).

Cultural structure

Since cultural factor and its variables are the main spatial structure of the cities, they include 13 indicators: public universities (C28), Payam Nour universities (C29), Islamic Azad universities (C30), University of Science – Applied (C31), training area for thousand people (C32), number of students to instructors (C33), coefficient of using theater (C34), number of theater for thousand people (C35), number of public libraries for thousand people (C36), number of cinemas for thousand people (C37), number of public parks (C38), number of relief committee for thousand people (C39), number of public courts for thousand people (C40), and number of mosques for thousand people (C41).

Structure of urban infrastructure facilities and equipment

The main indicators of this section include: number of slaughterhouse for thousand people (C42), number of fire station for thousand people (C43), number of waste transport vehicle for thousand people (C44), number of hotels for thousand people (C45), number of vegetable bazaar for thousand people (C46), number of cemetery for thousand people (C47), number of public restroom for thousand people (C48), number of restaurants for thousand people (C 49), number of public bath for thousand people (C50), number of industrial towns (C51), ratio of building license issued for residential units (C52), gas consumers per capita (C53), electricity consumers per capita (C54), municipal funding per capita (C55).

Transportation and communication structure

This section is one of the key sectors in spatial structure of the city and comprise of 12 indicators, including telephone installed for thousand people (C56), number of used telephones for thousand people (C57), number of post offices for thousand people (C58), number of bus for thousand people (C59), number of minibus for thousand people (C60), number of taxi for thousand people (C61), number of interurban passenger vehicles for thousand people (C62), communication network access indicator (C63), number of urban agencies for thousand people (C64), number of warehouses (C65), number of silo (C66), number of fridge (C67).

RESEARCH FINDINGS

Ranking of different cities in Qazvin province, 2006

Based on the most updated political-official divisions (2006), Qazvin province is comprised of 25 cities ranked in 67 indicators of population, social, economic, health-treatment, cultural, infrastructural, and transportation and communication section, measured by entropy weighing method and TOPSIS model. Based on the results (Tables 1 and 2), Qazvin city is the most developed city in population section, and Khak Ali is the most deprived city. In social section, Abgarm and Sagez Abad are the most developed and deprived cities, respectively. Indicator of householder to house show big cities have not good situation in this section due to the housing problems. In this section, there is a proper integration and scaling in spatial structure of the cities and inequalities of the cities is 0.19.

Another main and key indicator in urban spatial structure development is economic indicator. Based on this indicator, Qazvin city is the most developed and

Avaaj is the most deprived city of this province. In this indicator, big cities of the province and town centers gain the good place due to the official position and concentration of economic institutions and factories, which foster employment opportunities and welfare of the citizens. Small and newly formed cities were economically weak due to the inappropriate economic position and most of the job opportunities are in agriculture and animal husbandry section. Coefficient of variance was 1.84 which indicate deep gap between urban development and urban inequalities. In health-treatment section, Abgarm and Narjeh were the most developed and deprived cities, respectively. Qazvin city has very bad health situation and is in 18th place, which shows health-treatment indicators do not fit the population. In cultural, infrastructural, and communicational indicators, Qazvin city is the most developed and Abgarm, Zia Abad, and Sirdan are the most deprived cities. In general, among 25 cities, Qazvin city is the most developed (TOPSIS=0.8193) and Sirdan (TOPSIS=0.0102) is the most deprived cities of Qazvin province (Table 1).

Table 1. City ranking regarding different indicators and using Topsis (2006)

City	Population		Social		Economic		Health-treatment		Cultural		Infrastructure		Transportation and communication		Consolidate index	
	Topsis	Rank	Topsis	Rank	Topsis	Rank	Topsis	Rank	Topsis	Rank	Topsis	Rank	Topsis	Rank	Topsis	Rank
Qazvin	0.4785	1	0.6795	9	0.8848	1	0.4164	18	0.5725	1	0.8801	1	0.9355	1	0.8193	1
Takestan	0.4390	3	0.6713	15	0.3462	2	0.3527	22	0.3357	4	0.2057	4	0.1411	2	0.2565	2
Alvand	0.3692	10	0.6853	2	0.2284	3	0.3884	19	0.2233	8	0.3318	2	0.0171	13	0.2342	3
Eghbaliyeh	0.4376	4	0.6753	13	0.1688	4	0.3218	23	0.5012	3	0.1985	5	0.0531	7	0.2152	4
Abyek	0.4183	7	0.6815	6	0.1096	5	0.3648	20	0.3344	5	0.2244	3	0.0758	4	0.1744	5
Mohammadiyeh	0.3002	16	0.6770	11	0.0689	9	0.4782	8	0.5118	2	0.1274	7	0.0800	3	0.1737	6
Bidestan	0.4201	6	0.6812	7	0.0164	16	0.4769	9	0.1381	12	0.1556	6	0.0695	5	0.1150	7
Mahmood Abad Nemouneh	0.4606	2	0.6759	12	0.0748	8	0.7076	2	0.2492	7	0.1027	9	0.0556	6	0.1014	8
Sharifieh	0.2882	17	0.6840	4	0.0294	11	0.5628	5	0.2671	6	0.0478	13	0.0270	10	0.092	9
Bouin Zahra	0.3335	13	0.6695	10	0.1016	6	0.4368	12	0.1747	10	0.0375	18	0.0451	8	0.0626	10
Shal	0.3882	9	0.6846	3	0.0492	10	0.4255	15	0.0011	20	0.1033	8	0.0263	11	0.0611	11
Esfarvarin	0.2441	20	0.6839	5	0.0258	12	0.4321	13	0.1950	9	0.0232	23	0.0171	14	0.0610	12
Danesfahan	0.4252	5	0.6690	17	0.0166	15	0.4398	10	0.1641	11	0.0465	14	0.0304	9	0.0579	13
Zia Abad	0.1526	24	0.6640	18	0.0922	7	0.6100	3	0.0114	19	0.0151	25	0.0042	23	0.0537	14
Khoramdasht	0.3238	14	0.4572	24	0.0183	13	0.0000	24	0.0010	22	0.0717	10	0.0135	12	0.0389	15
Abgarm	0.2469	15	0.6860	1	0.0091	20	0.0000	25	0.0009	25	0.0594	11	0.0030	17	0.0291	16
Narjeh	0.2469	19	0.6799	8	0.0166	14	0.7634	1	0.0332	13	0.0446	15	0.0135	15	0.0267	17
Sagez Abad	0.1669	23	0.4116	25	0.0062	23	0.5856	4	0.0011	21	0.0317	20	0.0047	21	0.0264	18
Ardagh	0.2277	21	0.6740	14	0.0080	21	0.4383	11	0.0119	15	0.0484	12	0.0017	18	0.0228	19
Aavaj	0.3403	12	0.6166	21	0.0036	25	0.4784	7	0.0063	23	0.0417	17	0.0093	16	0.0206	20
Khakali	0.1484	25	0.5905	22	0.0056	24	0.4211	17	0.0016	24	0.0434	16	0.0041	24	0.0187	21
Moallem Kalayeh	0.1952	22	0.6416	19	0.0231	18	0.4225	16	0.0118	16	0.0309	21	0.0046	22	0.0158	22
Kouhin	0.2737	18	0.6292	20	0.0117	19	0.3539	21	0.0126	18	0.0317	19	0.0076	20	0.0154	23
Razmian	0.4138	8	0.6698	16	0.0074	22	0.4304	14	0.0119	14	0.0248	22	0.0099	19	0.0128	24
Sirdan	0.3635	11	0.5752	23	0.0146	17	0.4761	6	0.0029	17	0.0163	24	0.0012	25	0.0102	25
coefficient of variance	0.42		0.19		1.84		0.51		1.24		1.42		2.68		1.34	

Urban classification based on spatial distribution of population

Rapid growth of urbanization and expansion of its general networks are results of socio-economic development. What matters is not the number of citizens of urbanization coefficient, but its distribution in urban

network of the province. Entropy coefficient is used to analyze spatial distribution of population in urban network of Qazvin province. Qazvin province has ups and downs in population balance of urban centers; during 1986-1996 a relative balance was created in urban centers, but lost in next periods and this population

balance decreased in urban centers. Entropy of 1996 (0.82) decreased than 2006 (0.79), which indicate centralization of population in metropolitan of the province during under study periods. High centralization of industrial factories and investment in Qazvin prevent the middle cities to play significant role in de-centralization and spatial organization of urban network of the province.

Entropy model was used to analyze population settlement in cities of the city and spatial balance of the

region. According to table 2, it is shown that entropy coefficient of all studied years are less than 1, which represent a movement toward severe imbalance of population settlement in urban spaces of the province during last years. This is due to the centralization of population in big and average cities of the province and increasing number of small and rural cities has no effect on balancing population settlement.

Table 3. Entropy coefficient changes in cities of Qazvin province (1976-2006)

Entropy coefficient (G)	Napery logarithm of classes (LnK)	Number of classes (K)	Absolute entropy (H)	Year
0.73	2.73	5	2.21	1976
0.88	3.09	7	2.44	1986
0.82	3.19	12	2.48	1996
0.79	3.68	25	2.58	2006

(source: Statistical Yearbook of Qazvin province, 2007; calculation of author2010)

City ranking of Qazvin province in consolidated index

In previous discussions, population, social, economic, health-treatment, cultural, infrastructural and transportation and communication indicators were studied separately. In this section, 67 indicators of different sections are combined and the following results are obtained.

Qazvin city with TOPSIS of 0.8193 and comprising 44.73% of population of the province is the most developed city. Although, this city has not good position in some sections, which is due to high population problem that many big cities face in some indicators. In general, Qazvin city is the central city of the province and in historical, political, official, cultural and natural and human attractions, and centralization of institutes and organization is in high position.

Takestan, Alvand and Eghbaliyeh cities with TOPSIS of 0.2565, 0.2242 and 0.2152, respectively, are in developed position, including 24.28% of the population. Abyek, Mohammadiyeh, Bidestan, and Mahmood Abad Nemouneh include 16.25% of the population of the province and are in third place of development.

Low developed cities include Sharifieh, Bouin Zahra, Shal, Esfarvarin, Danesfahan, and Zia abad cities including 9.75% of population of the province. About half of the cities (11 cities) in this province are in very low developed rank and include 4.99% of the urban population of this province (table 3).

Calculated correlation coefficient between consolidated index and population is 0.974 with reliability of 99%. Therefore, findings indicate development of big cities and deprivation of small cities.

The results showed the regional space pattern of the province is following center-surrounding pattern due to general development, that is, when getting closer to big cities with more population, office and economic, cities get more developed. Up-down planning in country and regional planning of the country has increased deprivation of surrounding regions (map 1).

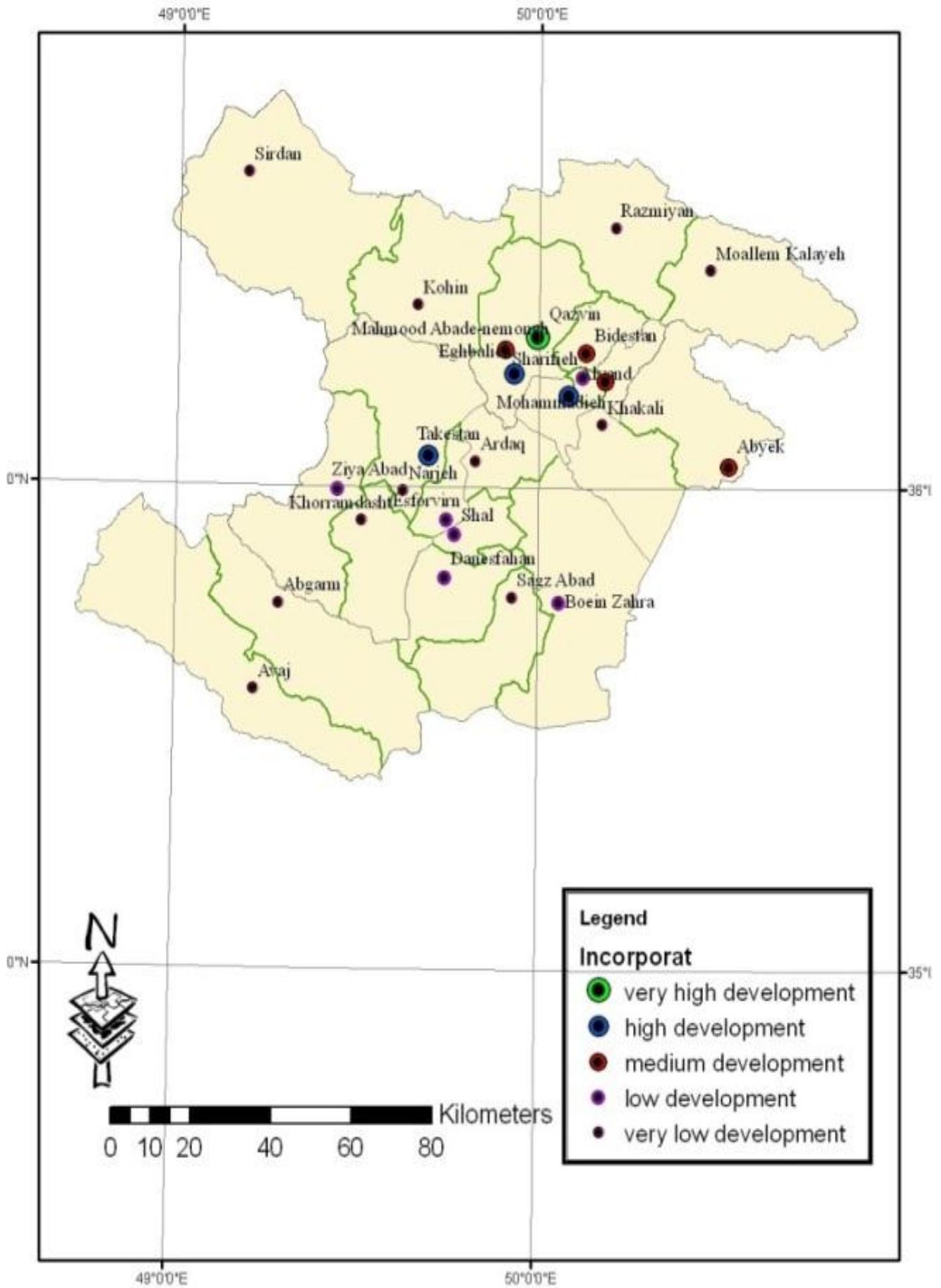
In previous levels of spatial structure, population, social, economic, health-treatment, cultural, infrastructural and transportation and communication indicators of cities in Qazvin province were studied using TOPSIS model. Then using K cluster analysis model, city ranking in 5 levels were studied. Among 25 cities of Qazvin province, regarding population, social, economic, health-treatment, cultural, infrastructural and transportation and communication indicators, Qazvin, Abgarm, Narjeh, are the most developed and Khakali, Sagez Abad, Aavaj, Abgarm-Abgarm, Zia Abad and Sirdan are the most deprived cities, respectively.

Scatter coefficient model indicate among different indicators, the most inequality belongs to cultural indicator and the least one belong to social indicators. Based on the results of study, economic factor has the most impact on spatial structure of cities in Qazvin province.

Table 3. ranking of cities in Qazvin province based on consolidated indicators (2006)

Groups	Cities	Number	Population (%)	Development level
1	One	Qazvin	44.73	Very high
2	Two	Takestan, Alvand, Eghbaliyeh	24.28	High
3	Three	Abyek, Mohammadiyeh, Bidestan, Mahmood Abad Nemouneh	16.25	Average
4	Four	Sharifieh, Bouin Zahra, Shal, Esfarvarin, Danesfahan, Zia Abad	9.75	Low
5	Five	Khakali, Abgarm, Aavaj, Ardaghm Sagez Abad, Khoramdasht, Narjeh, Razmian, Sirdan, Kouhin, Moallem Kalayeh	4.99	Very low

Source: Statistical Yearbook of Qazvin province, 2007; calculation of author, 2010



Map 1. Ranking of cities in Qazvin province by consolidated indexes (2006)

Spatial structure analysis of cities in Qazvin province

In this section, spatial structure of cities in Qazvin province are analyzed using advanced statistical techniques such as multi-variable variance analysis, path analysis and multiple regression analysis. In the next section, research hypothesis are analyzed.

In this part, different indicators of urban spatial structure, including population, social, economic, health-treatment, cultural, infrastructural and transportation and communication indicators are independent variables and consolidated index, as spatial structure of the cities, is dependent variable used to measure the effects of each of them on spatial structure of cities in the province.

Regression model of spatial structure determining factors of cities in Qazvin province

Using SPSS software and combined multiple regression models, influencing factors and indicators on spatial structure development of cities in Qazvin province were determined. Results show among different sections, economic, cultural, infrastructure and transportation and communication section are meaningful with 99% of reliability, other three parts are not meaningful because of weak relation with dependent variables. Table 4 explains the four sections of the model with 99.1% of changes in spatial structure development of cities in Qazvin province, and the rest of variances are predicted and explained by unknown factors that are not considered in this paper (Table 5).

Table 4. multiple regression analysis statistics of spatial structure of cities in Qazvin province

Multiple correlation coefficient	Coefficient of determination	Corrected coefficient of determination	Standard error
0.997	0.995	0.991	0.0115

Source: calculation of author, 2010

Table 5. multiple regression variance analysis of spatial structure of cities in Qazvin province

Change source	Sum squares	Degree of freedom	Mean square	Quantity F	Meaningfulness level
regression effect	0.700	7	0.100		
remaining	0.004	28	0.00	747	0.000
total	0.704	35	-		

Source: calculation of author, 2010

Considering β , it is clear that a change unit will be created in standard deviation of economic, cultural, infrastructure, communication and transportation equal to 0.392, 0.300, 0.220, 0.217 change units in spatial structure development of cities in the province, respectively. Population, social, health-treatment sections have very few effect on predicting spatial structure

development of cities in the province, for instance, a change unit in population create -0.01 change unit in spatial structure of the cities in the province that is negative and reductive (table 6). Table 7 approves meaningfulness of relation regression between variables with meaningful level of (Sig: 0/000) and reliability of 99%.

Table 6. Regression coefficient statistics of different sectors in spatial structure of cities in Qazvin province

Variable	Nonstandard coefficients		Standard coefficients	T	Meaningfulness level
	β	β error	β		
Intercept	0.035	0.015	-	2.375	0.025
population	-0.009	0.014	-0.010	-0.667	0.510
social	-0.038	0.025	-0.030	-1.557	0.131
economic	0.357	0.050	0.392	7.120	0.000
health-treatment	0.002	0.013	0.003	0.167	0.869
cultural	0.225	0.014	0.300	16.346	0.000
infrastructural	0.206	0.049	0.220	4.170	0.000
transportation and communication	0.197	0.038	0.217	5.201	0.000

Source: calculation of author, 2010; Dependent variable: consolidation indexes

Table 7. Multiple regression variance analysis of spatial structure of cities in Qazvin province

Change source	Sum squares	Degree of freedom	Mean square	Quantity F	Meaningfulness level
Regression effect	0.347	8	0.047		
Remaining	0.001	4	0.00	127.831	0.000
Total	0.376	12	-		

Source: calculation of author, 2010

Looking at β in table 8, it makes clear that cultural section has the most influence on predicting and developing spatial structure of cities in Qazvin province.

So that, change unit in cultural section deviation creates 0.525 unit changes in spatial structure of cities in the province. Among meaningful sections, health-treatment

and transportation and communication sections had negative β , that is, a unit change in standard deviation of these sections will create -0.169 and -0.245 changes in

spatial structure development of cities of the province, respectively. The effects of these sections are reverse and reductive (Tables 4, 5).

Table 8. Regression coefficient statistics of different sectors in spatial structure of cities in Qazvin province

Variable	Nonstandard coefficients		Standard coefficients	T	Meaningfulness level
	β	β error	β		
Intercept	0.014	0.031	-	0.460	0.670
Population	-0.051	0.030	-0.067	-1.682	0.168
Social	0.263	0.062	0.319	4.252	0.013
Economic	0.158	0.034	0.178	4.66	0.010
Health-Treatment	-0.088	0.039	-0.169	-2.271	0.076
Cultural	0.300	0.079	0.525	6.073	0.004
Infrastructural	0.334	0.079	0.457	6.868	0.009
Transportation and Communication	-0.175	0.058	-0.245	-3.015	0.039
Physical	0.164	0.039	0.185	4.246	0.013

DISCUSSION AND CONCLUSION

In this research, spatial structures of cities in Qazvin province are studied. Spatial structures include 67 indicators of population, social, economic, cultural, etc.

According to the official statistics of the country, number of cities in Qazvin province in 1976, 1986, 1996, and 2006 were 5, 7, 12, and 25, respectively. Based on the statistic data, total population of Qazvin province in 1976 was 535687 individuals. In 1986, this increased to 143200 individuals. Urban population growth trend of Qazvin province during 1976-2006 had increased 5.27%, which was mainly because of the increasing the number of small cities and natural growth of these cities.

Among 25 cities of Qazvin province based on population, social, economic, health-treatment, cultural, infrastructural and transportation and communication indicators, Qazvin, Abgarm, Qazvin, Narjeh, Qazvin, Qazvin, and Qazvin were the most developed and Khakali, Sagez Abad, Aavaj, Abgram, Abgarm, Zia Abad and Sirdan were the most deprived cities, respectively. Using coefficient of variance model, it is indicated that among different indicators, the most inequality is in cultural indicators and the least inequality belongs to social indicators.

Based on the path analysis results, economic factor has the most influence in spatial structure of all cities in Qazvin province. However, infrastructure and cultural sections has the most impact on cities of the province.

SUGGESTIONS

The first step in analyzing strategic planning of cities in Qazvin province is recognizing influential aspects and variables in urban development of cities. Therefore, the indicators can be used to investigate Strengths, Weaknesses, Opportunities and Threats (SWOT). Strength and weaknesses are internal and innate factors. Opportunities and threats are external and can affect the city other than potentials and capabilities (Hussey, 1991). The most important influential external factors are 19 applied in strategic planning of cities in Qazvin province.

According to the results of the study and analysis of each variable in cities of Qazvin province, and their

data in each city, they were standardized from 1-10. Then, Strengths, Weaknesses, Opportunities and Threats of each city were recognized from 19 variables. Ultimately, average coefficient of each factor (SWAT) of each city was calculated.

According to the studies, maximum strength belongs to Qazvin city (6.7) and the minimum of it belong to Sirdan (2.6). Maximum and minimum weakness belongs to Eghbaliyeh (7.2) and Sagez Abad (3.9) respectively. Mohammadiyeh has the most opportunities (7.2) and Abgarm has very less amount (3.1). Threat of Esfarvarin is 7.2, while in Sirdan it is 2.9. SWOT is the lowest in Sirdan.

After determining internal (strength and weakness) and external (opportunities, and threats) factors and their coefficient in Qazvin province, percent of each of the factors were calculated in cities of the province. In SWOT column of Table 9, percent of input variables of each model in each city of Qazvin province is shown. Then, its share to the four factors was determined. Finally, based on calculated percent, required strategy for each city is presented.

Based on Table 9, Qazvin city is the strongest (42.2), and Danesfahan (8.2) is the least strong cities. Shal is the weakest (47.9%) city and Moallem Kalayeh is least weak city (9%). Khakali has the most opportunity (32.2) and Abgarm has the least (5.3). Mohammadiyeh has the most threats (32.2%) and Aavaj has the least (10.2%). Therefore, according to the results of Table 9, some strategies are offered to achieve sustainable development of cities in Qazvin province. In this regard, 5 strategies are offered in this study including (Gasparini, 2005):

1. First type strategy: strengthening
2. Second type strategy: competitive (overcoming strategy)
3. Third type strategy: maintaining current situation (control condition)
4. Fourth type strategy: defensive (controlling negative factors)
5. Fifth type strategy: internal and external factor strategy to control the environment

Priority of each city in applying these strategies is suggested based on the last column of Table 9.

Table 9. Calculation of Strengths, Weaknesses, Opportunities and Threats and determining strategy in cities of Qazvin province

City	SWOT										Strategy
	S	W	O	T	Internal S/W	External O/T	Positive S/O	Negative W/T	SWOT		
1 Aavaj	30.2	24.7	24.7	10.2	58.2	35.8	58.2	41.3	72		
2 Khakali	20.4	14.5	32.2	20.4	38.2	55.7	55.7	44	66.7		
3 Moallem Kalayeh	36	9	23	22	47	46	62	61	79.2	firth	
4 Kouhin	29.3	19.9	13.9	11.2	57.2	34.9	56.2	40.5	71.1		
5 Razmian	19.6	14.7	30.4	19.6	37.2	54.9	54.9	43	65.9		
6 Sirdan	36.1	9.2	21.9	21.1	46.5	46	61	61.9	79.3		
7 Abgarm	23.2	33.7	5.2	27.5	60.1	33.9	28.5	54.8	76		
8 Narjeh	30.2	30.2	3.2	23.6	63.5	27	33.5	57	59.4	second	
9 Sagez Abad	22.4	31.9	5.4	29.7	57.2	36.9	27.7	52.9	73.7		
10 Ardagh	27.4	28.4	3.1	22.8	61.8	26.8	32.7	55.5	56.6		
11 Shal	8.3	47.9	8.2	30.2	55.2	38.5	14.5	37.5	46		
12 Esfarvarin	31.2	11.1	18.1	30.2	41.3	51.4	51.4	63.5	71		
13 Danesfahan	8.2	47	8.2	31.2	55.2	37.5	15.5	38.5	47		
14 Zia Abad	27.4	10.2	15.3	26.4	37.5	46.6	47.6	61.8	69	third	
15 Khoramdasht	22.8	28.4	6.7	29.4	56	35.9	29.4	56	57.6		
16 Mahmood Abad Nemouneh	31.4	11.2	16.3	29.4	40.5	51.6	49.6	61.7	68		
17 Sharifiyeh	23.8	30.4	6.7	29.4	56	36.9	31.4	57	59.6		
18 Abyek	26.5	34.6	12.2	18.3	61.2	32.6	39.8	47	55.2		
19 Mohammadih	20.4	32.2	5.8	32.2	55.7	38.1	26.3	55.7	66.7	fourth	
20 Bidestan	25.7	31.8	11.4	17.5	59.4	31.8	40.9	46	54.4		
21 Eghbalieh	19.6	31.4	5.9	31.4	54.9	37.3	25.5	54.9	66.9		
22 Bouin Zahra	31.2	19.1	20.1	21.1	52.4	42.3	51.4	52.4	74.2		
23 Takestan	29.6	14.6	18.5	28.5	44.4	49.7	50.7	59.3	75	fifth	
24 Alvan	28.9	15.8	21.9	29.7	45.6	50.9	49.9	60.1	76.3		
25 Qazvin	42.4	14.5	13.7	23.1	57.2	37.6	57.5	67.4	80.3		

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