

The Role of Middle Cities in Regional Sustainable Development Case study: Iranshahr



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Abstract

At the present time, the tendency of planners in most developing countries shifted toward spatial decentralization, decreasing regional inequality, sustainable development and dichotomy of urban-rural areas. That is why different urbanization strategies have been developed. Strengthening middle cities is considered one of the most important strategies. The research method is an analytical-descriptive one and the role of Iranshahr as a middle city in the regional development has been evaluated, using quantities analysis and model such as rank -size, entropy, extended model, gravity and location quotient. Findings show that population density and social-economical services in the center of province has been increased. Therefore, the solution to the regional balance development is supporting middle cities and providing them with facilities. Consequently, development and supporting of middle cities can play a significant role in the sustainable development of peripheral regions of these cities.

Key words: Regional development, Sustainable development, Middle cities, Iranshahr

1. Introduction

In developing countries there is a complete discontinuity between big and small cities. Much higher level of social and economic services is dedicated to big cities. Small and middle cities having poor communication with surrounding communities lower than themselves marginalized. Zeyari and Aqadam (2008). The consequences of disappearing small and middle cities is genesis of chain of urban networks in which small and middle cities and even in some cases villages directly connect to main city .Hesamyan et al (2006).City's policies for the first time declared in the sixth French social and economic development program (1971-75). These policies were employed for seven cities. Small and middle urban growth theory is based on spatial-surrounding logic.Qarakhlo et al (1999). The original founder of middle cities, Rondinelli, defined the role of middle cities as provision of services, agro-based industry, small-scale industry and transport services .PapolyYazdi et al (2003). Attention of planners' inmost developing countries shifted toward spatial-physical decentralization of

lands with the aim of keeping balance of settlement system, controlling the abnormal population growth, reducing regional disparity. Consequently different strategies were adopted in population distribution and urbanization. In this regard one of the most strategies is to support medium-sized cities in a country network .Taqvayei et al (2008).

Sustainable development has different dimension. Sustainable development foundations are based on basic social, political, cultural, economic and environmental development. A middle city that acts as a bridge between big and small cities can contribute effectively to regional sustainable development. One of the ways that has been proposed for regional sustainable development in international level (program21, 1999) is to encourage development of middle cities. Middle cities with balanced development can reduce regional social, economic differences and help achieving sustainable development.

In developing countries, including Iran uncontrolled growth of metropolitan regions and assigning all facilities to these regions resulted in distribution of unbalanced population. This issue has been source of many problems and created many inconsistencies .Nazmfar and amini (2010). Increasing population and number of cities has caused great problems to middle cities, small cities and villages .Taqvayie et al (2010). So solution to the balanced development is to support small cities, especially middle cities. These cities can play an effective role in regional development and facility distribution.in Sistan and Baluchistan, Iranshahr, a middle city, with population of 110 thousand people located in the center of province. Regarding it's Antiquity, population and geographical status, Iranshar in case of upgrading and equipping in economic and service areas can play a significant role in the development of surrounding regions. The purpose of this article is to know the role of the middle city, Iranshahr, in regional development and its place in the social and economic structure of region and influential area.

2. Data and Material

Data and research materials that have been used in this paper are quantitative model and methods such as: rank-size, extended model, entropy, gravity, location coefficient and they have been analyzed and evaluated in terms of demographic and economic variables.

3. Research Methodology

This article is an applied research that done by documental-analytical method. This study aimed to determine the role of middle city, iranshahr, in planning regional development and social and economic structures. Documental- analytic method used for collecting information.

4. Results and Analysis

4-1. Rank-size model

In 1949, this model was formulated by George zipf for ranking residents based on population. According to this model, population of the second city of the region is $\frac{1}{2}$ population of first city, population of the third city is $\frac{1}{3}$ population of the first city and $\frac{1}{2}$ population of the first city and so on.

The result of model shows that according to the application of the modified model to what extent population of the first city should be declined and added to the second and third cities .Amanpour et al (2011).

$$P_n = P_1/R \quad \text{Eq (1).}^1$$

$$Pr_{th} = (\sum P_{1+n} \div R_{th}) / (\sum 1/R_1 + 1/R_2 + \dots + 1/R_n) \quad \text{Eq (2).}^2$$

By using rank-size model, Urban hierarchy of Iranshahr city shows that iranshahr population is 10 times more than second city, 12 times more than third city and 20 times more than the fourth city. The result of this model indicates that there is a sever imbalance in urban settlement in the city so that 86% of the urban population have settled in iranshahr and the distance between the first with other cities is very high. The obtained data show that iranshahr city has not followed rank-sized model. Therefore to reach equilibrium in urban settlement hierarchy in city level, strategies for regional development and settlement of services and facilities is required. Settlement of facilities and investment in lower –ranking cities prevent migration to larger cities and reduce population of Iranshahr.

Ranking	city	Real population	Model population	difference	Modified model	Overpopulation or under population
1	Iranshahr	100642	100642	0	55925	44717
2	Bampoor	9323	50321	-40998	27692	-18369
3	Bazman	4163	33547	-29384	18641	-14478
4	Mohamadan	2384	25160	-22776	13981	-11597

Table 1. Rank-size of iranshahr’s cities in, 2006

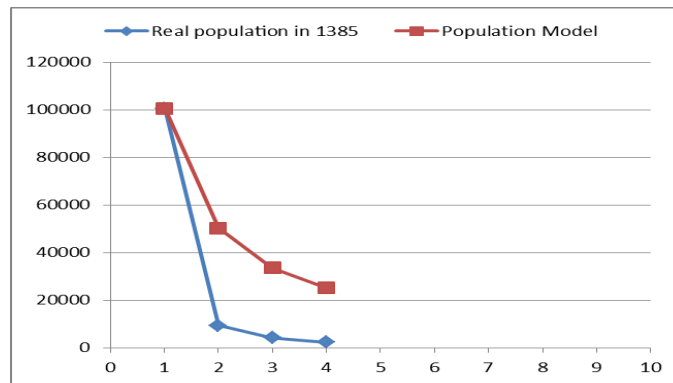


Fig 1. Rank-size of iranshahr’s cities in, 2006

¹ Equation Rank-size model

² Equation modified Rank-size model

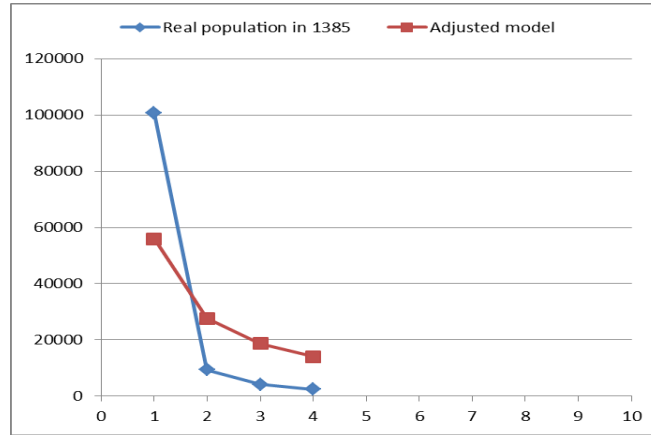


Fig 2. Modified rank-size of iranshahr's cities in, 2006

4-2 .Extended model

This is the model in which we can measure the percentage of urban population out of total population. It means to know by increasing every one percent in the total population of (country, province, and city) how much population decrease or increase. Also, by this index we can calculate tendencies of region and the degree of population extension. Hekmatneya and Mousavi (2006). Extension index is one or higher than one .Zeyari and Taqimoqadam (2008). When extension coefficient is greater than one it means that more crowds attracted and vice versa .Soltani(2011).

$$E(t,t+10)=Y_u(t,t+10)/r(t,t+10) \quad \text{Eq (3).}^3$$

Characteristics	Period 1956-66		Period 1966-76		Period 1976-86		Period 1986-96		Period 1996-2006	
	Growth rate	extension	Growth rate	extension	Growth rate	extension	Growth rate	extension	Growth rate	extension
Province	0.6		3.8		6.1		3.7		3.4	
Whole cities of province	6.78	11.45	8.49	2.24	11.60	1.91	5.00	1.36	4.15	1.23
Middle cities of province	-	-	-	-	-	-	3.00	0.82	3.94	0.87
iranshahr	4.06	6.77	7.77	3.05	13.40	2.20	6.75	1.83	2.72	0.8

Table 2. Extension degree of iranshahr during 5 census period

Our findings indicate that extension coefficient in two censuses from 1986-96 and 1996-2006 in middle cities of province is less than whole cities of province. This means that by growing numbers of small towns in province and establishing services and facilities, immigration to middle cities and extension coefficient has decreased.

Extension coefficient of iranshahr in 1956-66, 1966-76, 1976-86 and 1996-2006 has decreased to 6.77, 2.05, 1.83 and 0.8 respectively. This means that iranshahr as a middle city thanks to its facilities and educational, cultural and health services has attracted more people from surrounding regions and only in 1996-2006 due to increasing numbers of small cities and establishment of services immigration has decreased.

³ Equation Extended model

4-3 .Entropy model

This model is a criterion for measuring urban population distribution and distribution of city classes in a region. Using this model, we understand spatial balance of population settlement, number of cities in urban, provincial, regional and national network. If entropy approaches zero it signifies imbalance in urban population distribution and if entropy is one or greater than one it means that population distributed justly in region. Hekmatneya and Mousavi (2006).

The result of the entropy model indicate that during 1986-2006 population including iranshahr has reached from 74% to 74%.this distribution reflects greater population distribution in province level, so we conclude that on the whole spatial population distribution and number of cities moving toward balance.

$$H=-\sum P_i \ln P_i \quad \text{Eq (4).}^4$$

$$G=H/\ln K \quad \text{Eq (5).}^5$$

Year	1986	1996	2006
The whole entropy in province sistan and balochistan	0.74	0.73	0.75
Entropy without middle cities	0.46	0.47	0.64
Entropy without iranshahr	0.51	0.58	0.71

Table 3.entropy in Sistan and Baluchistan province from 65 to 85

4-4 .Influential area

Reilly model (Theory of spheres of influence)

This theory is the first theory of the interaction of Change and Adjusted. It tries to separate the boundary line between two commercial regions from each other. The overall structure of this model is as follows: Hekmatneya and Mousavi (2006).

$$B.P.D=d/ (1+\sqrt{(P_i/P_s)}) \quad \text{Eq (6).}^6$$

According to this model, cities in the table below are directly associated with iranshahr. The result obtained from this model shows that some parts of Khash, Nikshahr, Sarbaz, Zaboil and Dalgun cities are under influence of iranshahr. This model shows that in city level iranshahr has the most influence with Bazman and also in province level has the most influence with Nikshahr.

Calculation by Rayleigh model (Theory of spheres of influence) shows influential area of iranshahr as follows:

⁴Equation Entropy model

⁵ Equation Entropy model

⁶Equation Reilly model

characteristics	Khash	Espakeh	Nikshahr	Rask	Golemorti	Bazman	zaboli
Direction	North East	South West	South West	South	West	North	East
Influential area of iranshahr	88.1km	95.8km	176.3km	133km	118.4km	88.1km	93.4km

Table 4. Influential area of iranshahr with other cities

4-5 .Location Quotient model

Location Quotient model is one of the regional analysis models that examine the relationship of regions with each other. According to this theory, the economics of region is divided in two parts namely basic and non-basic part. The basic part contains all kinds of activities that their final market is out of region and exports services and goods. The non-basic parts consisted of economic activities of region that their final market is inside the region and produces goods and services for domestic consumption. In this model if $L.Q > 1$ It means that the city is exporter and this is its basic activity and if $L.Q < 1$ this city is importer and this activity is a non-basic one. Furthermore if $L.Q = 1$ the city is self-sufficient Hekmatneya and Mousavi (2006).

$$LQ = (TNi/TNa) / (CNI/CNa) \quad \text{Eq (7).}^7$$

The data show that in two censuses iranshahr experienced almost identical economic status. According to LQ model data, during 1996 and 2006 iranshahr status from industrial, agricultural and services point of view has gradually increased and by increasing LQ moved toward basic condition.

Share of economic part						LQ of iranshahr		
year	Economic part	Iranshahr	Iranshahr city	province	country	Iranshahr city	province	Country
1996	Agriculture	761	22224	104386	3357263	0.128	0.171	0.245
	Industry	4307	11099	71619	4472958	1.452	1.410	1.046
	Services	8339	16859	139341	6741351	1.851	1.407	1.344
	Total	13407	50182	315346	14571572			
2006	Agriculture	1020	9690	77615	3686747	0.206	0.303	0.306
	Industry	6315	6673	106803	6493398	1.853	1.363	1.076
	Services	11165	19859	242265	10296199	1.101	1.063	1.200
	Total	18500	36222	426683	20476344			

Table 5.location Quotient of iranshahr from 75 to 85

5. Conclusions

Middle cities play a significant role in strengthening regional development. Every city has this potential can attract immigrants and provide working condition. In this paper the role of iranshahr as a middle city in social, economic and spatial structure by demographic, economic model and influential area examined. According to rank size, extended and entropy model

⁷ Equation Location Quotient model

iranshahr's population has dramatically increased, these mainly refers to establishment of facilities and services in iranshahr.

By using rank-size model, the obtained data show that iranshahr city has not followed rank-sized model. Therefore to reach equilibrium in urban settlement hierarchy in city level, strategies for regional development and settlement of services and facilities is required. Settlement of facilities and investment in lower –ranking cities prevent migration to larger cities and reduce population of Iranshahr. Extended coefficient of iranshahr shows that iranshahr as a middle city thanks to its facilities and educational, cultural and health services has attracted more people from surrounding regions and only in 1996-2006 due to increasing numbers of small cities and establishment of services immigration has decreased. The results of the entropy model indicate that during 1976-2006 population including iranshahr has reached from 74% to 74%.this distribution reflects greater population distribution in province level, so we conclude that on the whole spatial population distribution and number of cities moving toward balance.

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To sum up, the result obtain from models indicates that iranshahr has had an effective role in in regional sustainable development. Furthermore findings show iranshahr succeeded in attracting immigrants and exporting agricultural, industrial and economic services. This city occupied the first place in terms of providing services to the surrounding areas. Therefore, in case of upgrading and supporting iranshahr can play a significant role in the development of surrounding regions.

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