


Original Research Paper

## The Strategic Role of Intermediate Cities in Regional Development: A Case Study of Bonab

Marziyeh Taleshi Anbouhi\*: MSc. Geography and Urban Planning, University of Gilan, Gilan, Iran.

ARTICLE INFO	Abstract
<p><b>Received:</b> 2024/11/22 <b>Accepted:</b> 2025/02/27 <b>PP:</b> 41-52</p> <p>Use your device to scan and read the article online</p> 	<p>Development of mediate cities has emerged as a promising approach to foster balanced regional growth and to counteract the challenges posed by the rapid expansion of mega cities. This study focuses on the role of Bonab, a mediate city, in the regional development of East Azerbaijan province. Employing quantitative models that analyze both population dynamics and economic indicators, the research utilizes a descriptive and analytical methodology. Data were meticulously gathered from library documents and existing literature, ensuring a comprehensive view of the factors influencing Bonab's development. Population-related models indicate that Bonab exhibits significant flexibility in accommodating migrants, which has, in turn, resulted in an imbalanced urban structure relative to other cities within the province. The deficiency of settlements designed to host populations in the urban hierarchical system—specifically in groups ranging from 250,000 to 500,000 and 500,000 to 1,000,000—has diminished the city's effectiveness in contributing to regional balance and a regular distribution of the urban hierarchy. This lack of structured settlement has hampered its potential as a moderating force within the province. On the economic front, quantitative models reveal that Bonab is uniquely positioned among the province's mediate cities, as it possesses fundamental conditions in both the service and agricultural sectors. In contrast, other cities in the region maintain a robust agricultural base but fall short in industrial and service dimensions. Given these strengths, Bonab holds substantial promise to evolve into a central hub for service and agricultural activities, particularly benefiting the southern areas of East Azerbaijan province. By strengthening its infrastructure, attracting targeted investments.</p>
<p><b>Keywords:</b> Mediate City, Development, Regional Development, Bonab</p>	

**Citation:** Taleshi Anbouhi, M. (2024). **Spatial Analysis of Global Innovation Indicators in Selected Countries with Emphasis on Iran.** *Journal of Land Use and Sustainable Development*, 1(1), 41-52.

**DOI:** 10.82173/jlusc.2025.1203000

### COPYRIGHTS

©2023 The author(s). This is an open access article distributed under the terms of the Creative Commons Attribution (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, as long as the original authors and source are cited. No permission is required from the authors or the publishers.



\* **Corresponding author:** Marziyeh Taleshi Anbouhi **Email:** [m.taleshi70@gmail.com](mailto:m.taleshi70@gmail.com) **Tel:** +989145867992

## INTRODUCTION

During the last few decades, small towns have changed rapidly into big cities (Smith, 2020). This issue mostly exists in undeveloped or developing countries. While urbanization is not uniformly taken place around the world, big and capital cities are more urbanized instead and in some countries almost 30 percent of the whole population are centralized in such cities (Nazarian, 2004) and it leads to the inconsistent city networks in these countries. During the last years, majority of the developing countries face emerging megacities, general rupture and separation in the city networks, uneven regional distribution of facilities, inconsistency in domicile and other areas.

Attention paid by the urban planners to the ongoing challenges leads them to take different strategies in urban population distribution. One of these important strategies was the creation of organized networks of middle-sized cities; having special capabilities and definite thresholds, services and equipments, can be effective in increased growth and harmonious distribution (Randinily, 1983). This theory is based on the concept of mediate city. Randinly believes in the considerable effect of these types of cities on indiscrete regional development. These cities are as the centers to provide services to the smaller domicile areas and as distribution centers of goods and services (Randinly, 1985). Centralization of the population as well as all facilities in the big cities leading toward creation of first urban arrangement and destruction of hierarchical city order is one of the biggest issues of the third world countries including our own country. This issue is as the result of imbalanced regional facility distribution and ignoring the potentialities of the smaller and mediate cities. In order to solve the mentioned problems, different strategies have been taken into consideration, some of which are paying attention to the role of mediate cities in the creation of regional balance and developing the least developed areas. East Azerbaijan province was not an exception of this rule; since urbanization has increasingly grown there during the last fifty years. Cultural attractions, tourism, entertainment, geographical location, economy, politics and historical condition, implementation of the industrial project and governmental investment during the last few decades caused Tabriz to develop faster and to

attract more population and it leads to the destruction of regional balance. City of Tabriz is the home for almost 58 percent of the city population and this is the reason behind the regional centralized economy, so developing the small and mediate cities and directing immigration towards these cities are the most important strategies to be followed in the province. Since lack of balance in the settlement of the population is as the consequence of illogical migrations towards big cities, so small and mediate cities can provide a condition in which logical hierarchical discipline can be achieved (Azimi, 2001; Jones and Lee, 2018). Present paper studies the role and importance of Bonab in regional development of East Azerbaijan province.

## Literature Review

Probably the idea of studying the effect of the functioning of mediate and small cities at the local and regional level is introduced by Janson (1970) and "center of rural development" by Fanel (1976) for the first time (Weaver, 1990). Filho believes that the role and importance of small as well as mediate cities has got more attention since 1970s. The main motivation behind studying mediate cities in the present form should be looked for in post-war Europe, when the need to plan a new land was introduced with the aim of balanced distribution of actions, wealth and population at both regional as well as national levels (Brown and Chen: 2020). In order to decentralize and to create more moderate city discipline, the policy of strengthening mediate cities got introduces for the first time in the 6th Social and Economical Development Plan of France (1971-1975).

Randinelli as one of the main founders of the mediate cities strategy with the help of Ruddel made a deep and vast discussion in this field by writing a book titled "City functions in rural development" at 1987 (Randinelli, 1987). In this book, creation as well as strengthening of mediate and small cities in functional relation with rural districts is emphasized in order to provide variety to the economy, industrialization, providing services, commercializing agriculture and organizing as well as managing development. Ruddel considers development of mediate and small cities as a suitable method of locational development, creation of economical growth

and social balance as well. He also believes in transferring investments from the big cities toward smaller ones (Zarabi, 1999). Alenso believes that the development and strengthening of middle-sized cities, especially those which have shown greater capacity to attract more population, can lead to proper completion of city network (Shokoei and Bageri, 1996). Friedman and Douglas taking a locational approach suggested Agrolitin and consider correlation between cities and villages and familiarizing local people with the urban life as the basic requirements for regional development (Sarafi, 2000). Hardway and Saterdwright (1986) compiled a book titled "The role of mediate and small cities in the regional and national development in the third world countries", the stated conclusion of which are as follows:

- Heterogeneity of mediate and small cities with the big ones.
- Lack of research regarding small urban centers in the third world countries.
- Key and significant role of mediate and small cities in controlling offices, politicians and military people of the region.
- Deep and strong relations between agriculture and rural development with the development of small urban centers.
- Strong effect of new transportation systems on development of urban centers (Zebardast, 2004).

Kanzmn considers supporting and strengthening of mediate cities as a key to successful regional planning policy. He believes: "reviewing the results of regional development plans signifies that most of the goals; because of factors such as international dependence, financial problems, economical centralization, shortage of efficient and skilled laborers, forgetting basic needs and ignoring decentralized methods, are not realized (Kanzmn, 1985).

In Iran, as the result of first growing capitalism in a single-product based economy and in the continuous of a 100 years old trend of social changes, we are witnessing an imbalanced network of cities in which big cities having no coherence with small and mediate cities, have allocated all higher levels of economy, society, industry and services to themselves. In these conditions, small and mediate cities have got

less growth potentiality and they have changed into slums and outskirts.

Necessity and the significance of research:

During the last few years due to the rapid growth of the big cities in our country issue such as housing shortage, economical problems, poverty, slums and pollution have been created. Accordingly, majority of researchers believe there should be substantial planning with their main focus on dynamism of middle-sized and small cities. This way, in spite of similar facilities in the mediate cities, it will be possible to prevent migrations to megacities at regional level and second grade cities will be chosen by the immigrants to move in. In fact development and strengthening of mediate cities is a policy which is convergent with decentralization goals and in the long run can lead to some conditions that can make their production capacity stronger (Garcia, 2020). Randinelli refers to the following points as the reason to pay more attention to mediate cities to create regional development:

1. Mediate cities can decrease the problems that housing, transportation, employment and providing urban services can cause in the big cities.
2. Mediate cities can decrease the regional inequalities, since development of urban facilities and services in these types of cities can decrease the existing inequalities.
3. Mediate cities can decrease centralization of offices in the megacities and can make the condition better for the public as well as private investment in the mediate and all other types of cities.
4. Investment in the mediate and small cities can create job opportunities for the unemployed as well as rural immigrants and finally leads to decreased poverty.
5. Through making facilities and market available to the agricultural products, these cities make the economy of the rural areas as dynamic as possible.

Role of mediate cities in Iran city network:

Daily growth of the megacities is considered as a significant characteristic of developing countries (Azimi, 2002) that signifies the depth of unhealthy nature of social structures in these countries (Shokoei, 2004). As per the reports of UN published in 1980, 71 countries out of 114 developing countries (almost 62 percent) used to believe their population distribution is unacceptable and 24 countries (or 20 percent) refer to the locational distribution of their

countries as unacceptable and consequently believe in intervention and some policy making in this area (Saraei and Eskandari Sani, 2006: 165). In fact, megacities in developing countries; by attracting more population, have been the main obstacles against comprehensive and integrated socio-economical development. Mediate and small cities always used to be as slums having almost no role and effectiveness. In Iran, along with increasing urbanization starting by land reforms in 1966 and consequently huge population and economical changes and gaps among big, mediate and small cities; the population settlement patterns did not follow proper exploitation systems as per the existing capabilities, so the population settlement appears to be imbalanced. Imbalanced distribution pattern of city centers have left a deterrent effect on the trend of the city development (Fani, 2003). As in the case of Tehran, some metropolitan cities are organized to provide professional, economical as well as

political services. So the network of mediate and small cities, while being adjoined with the higher levels of Iran urban arrangement, has kept its organic relations with rural society and agriculture (Nazarian, 2004).

### The Area under Study

Bonab is one of the 20 cities of East Azerbaijan province, located at the west of Maragheh, south of Uromia Lake and southwest part of the province. Bonab is restricted by Maragheh from north and east, by Uromia Lake and West Azerbaijan province from its northwest and west and by West Azerbaijan province and Malekan from its south. It is 778/79 Km<sup>2</sup>, located at 6 degree and 54 minutes to 37 degree and 10 minutes of north latitude, 45 degree and 30 minutes to 46 degree on east longitude. As per the latest country political divisions, Bonab has got a central part, 3 villages, 1 urban point and 28 oases. (Fig. 1).

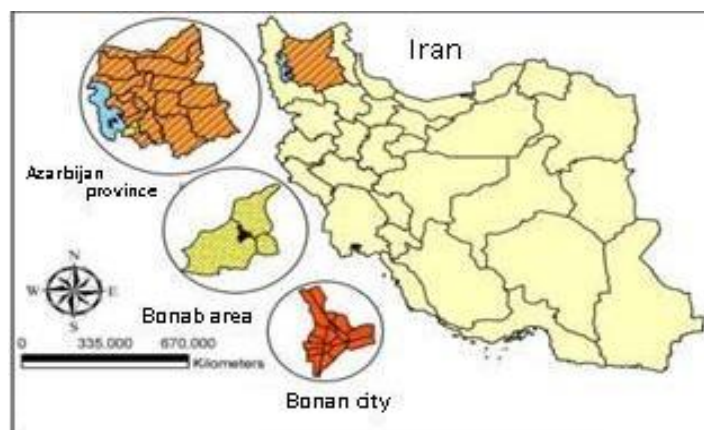


Figure 1. Location Of Bonab In Political Divisions Of East Azerbaijan Province

### Methodology

Descriptive-analytical method of research is applied in this paper. Present research is of applied-theoretical type. In this study, required basic statistical data is collected first from data sources such as Iran Statistics Center, statistical CD's (statistical almanacs and descriptive results of public census), project reports, research papers and etc. through library study and then are calculated and analyzed. Quantitative type of analysis is applied in this paper. Methods and statistical patterns such as "the Rank-Size Rule" is used to study the equilibrium or disequilibrium ranking of the cities of province, "Entropy Index" to analyze the characteristics of population locational distribution in the city network of the province,

"Elasticity co-efficient model" to study population elasticity in a regional scale, "Location Quotient" to compare the economy performance of the city and province, "Izard length-Width model" to identify and predict economical parts of the city or region and "Shift-Share Analysis" to study growth difference between economical parts of the city with those of the referent economy (Hekmatnia and Mosavi).

### Results and Discussion

Under this model, all cities of East Azerbaijan province are studied in 2011, while including Bonab at first and then excluding it next, in order to identify their position equilibrium and disequilibrium rank. If the cities are arranged



alphabetically, then the second city should have half the population of the first and the third one should only have one third of the population of the first city and so on. At East Azerbaijan province level, studies show that the population of first city in 2011 was 9.2 times bigger than the second, 12 times bigger than the third, 15.7 times bigger than the fourth, 16.1 times bigger than the fifth and 1181 times bigger than the population of the last city of the province. If the same analysis continues, it can be understood that the population of the first city was 19/5 times bigger than the population of Bonab in

1986, 18.7 times bigger in 1996, 18.2 times bigger in 2006 and 18.7 times bigger in 2011. In this part, the trend of first changing cities of East Azerbaijan province during 1986-2011 is studied compare to Bonab. From the highest amount of first city index of 1986, it is calculated to be 19.5 times bigger than Bonab. From 1986 onwards the trend declines but from 2011 it starts to ascend again and becomes 18.7 times bigger than Bonab, this is due to the intensified “Macrosocial”. During the last 50 years, this super excellent quality has got tensed and also it got fixed in number (table 1).

Table 1. First City Shifts Trend In East Azerbaijan

	1986	1996	2006	2011
Population of first city	971482	1191043	1398060	1494998
Population of 6th city (Bonab)	49770	63719	76610	79894
Optimum population	61287	74344	86631	92182
Deviation of optimum population from actual population	11517	11146	10021	12288
Quantity(q)	1.7	1.6	1.6	1.6

Source: Iran Statistics Center, Research Results

Even though the population of the cities have got increased during these years, but there seems to be increased hierarchical gap between the megacity of Tabriz and other cities of the province. As per the “Rank-Size Rule” and also taking Bonab into account, it can be easily understood that the linear slope was equal to -1.36, -1.43, -1.44 and -1.47 at 1986, 1996, 2006 and 2011 respectively and deflecting angle with the first city has got increased. In order to get a proper understanding of the effects of Bonab as a mediate city on the city arrangement of the province, the condition was studied while ignoring Bonab.

Results of the study signifies that Bonab has not got considerable effects on locational balance

Table 2. Linear Equation Of Logarithm Distribution Of Cities Based On Rank-Size Rule For 1986 To 2011

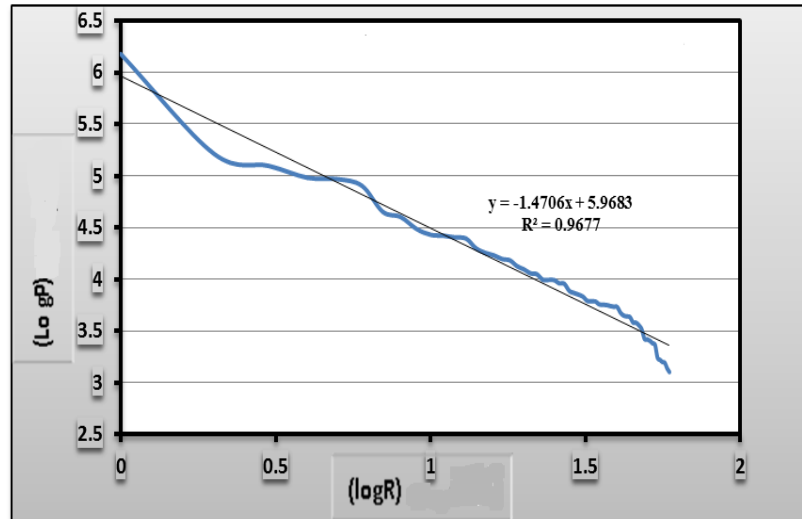
year	1986	1996	2006	2011
description				
Including Bonab	$y = -1.36x + 5.700$	$y = -1.43x + 5.836$	$y = -1.44x + 5.916$	$y = -1.47x + 5.836$
Excluding Bonab	$y = -1.35x + 5.652$	$y = -1.41x + 5.783$	$y = -1.42x + 5.862$	$y = -1.45x + 5.836$

Line coefficient with the Rank-Size Rule slope for equilibrium is -1.724 for the year 2011. It signifies the existence of disequilibrium in the regression linear slope of arrangement and city network of East Azerbaijan. The calculated numbers shows the dominance of first city on

and disciplined hierarchical city distribution; since during 1986, 1996, 2006 and 2011 the linear slopes were -1.35, -1.41, -1.42 and -1.45 respectively. Increased imbalance from 1986 to 2011 is clearly visible and increased linear slope proves of this fact.

Due to its unique location on major transportation routes, Bonab has changed into the center of industry and economy and it has played a significant role in decentralization of industries and factories from being concentrated in Tabriz, however Tabriz still stands at the top of the city arrangement of the province due to its geographical condition and being the home for all governmental offices and institutions (table 2).

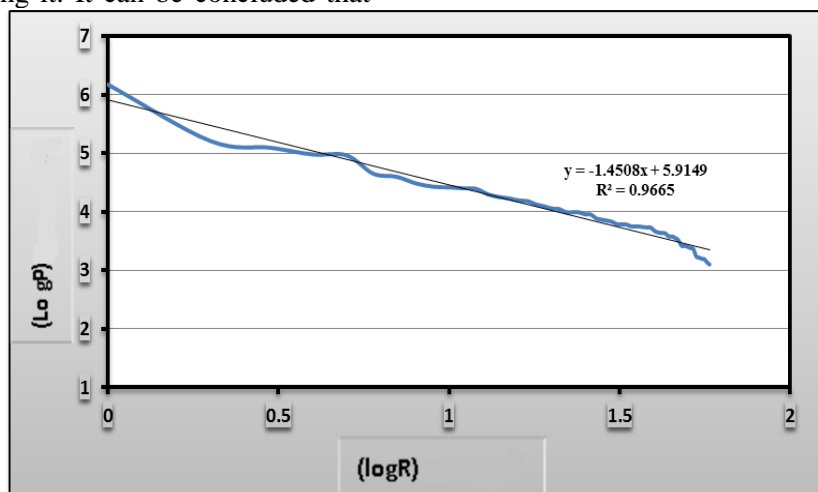
whole city network of the province. In fact lack of cities with population mount to 250-500 thousands and 500-1000 thousands among the first city and other cities of the province has intensified the imbalanced status.



Graph 1. Rank-Size Rule based city distribution algorithm of the province including Bonab for the year 2011

Line coefficient with the Rank-Size Rule slope; while excluding Bonab, for the studied year was -1.450. Compare to the Logarithm Distribution Table for the time Bonab is included, it can be seen that the same disequilibrium in the regression linear slope still exists even in the case of excluding it. It can be concluded that

Bonab has less important role in keeping this slope balanced and the imbalanced status is more between first, second and third cities and this is due to lack of mediate cities (cities of 250-500 and 500-1000 thousands population) in the city network of the province.



Graph 2. Rank-Size Rule based city distribution algorithm of the province excluding Bonab for the year 2011

### Entropy coefficient

This model generally can be claimed as a scale to assess the uniformity of a variable (e.g. population distribution) in the cities of a region. By use of this model, locational balance of the settlement of the population in national and regional city network can be understood. Entropy coefficient formula is as follows:

$$(1) H = -(\sum P_i - \ln P_i)$$

By use of the Entropy pattern, the role of Bonab in creating balance; while putting the focus on population distribution policy of the province, is analyzed. Considering all the cities

of the province for the years 1986-2011, Entropy coefficient shows disequilibrium in the city network of the province. In order to make a more accurate assessment of the effects of mediate cities on the population distribution of the province, this analysis is done for both the conditions (while including and also excluding the cities). In case of ignoring the populational functions of mediate cities, East Azerbaijan province for all 4 periods (e.g. 1986, 1996, 2006 and 2011) is getting far from the population balance in its city centers. This coefficient;

while excluding Bonab, has got lesser in all years and signifies more imbalanced city network of the province (table 3).

Table 3. Entropy on East Azerbaijan province while including as well as excluding mediate cities

Year	1986	1996	2006	2011
Including cities of the province	0.523	0.509	0.500	0.505
Excluding mediate cities	0.430	0.385	0.390	0.81
Excluding Bonab	0.488	0.482	0.492	0.507

### Elasticity coefficient

In order to assess the capabilities of the cities in attracting and stabilizing the population of the region, elasticity coefficient is used. This coefficient is used to identify and assess the populational flexibility of the cities. It can be calculate as followings.

$$(1) \quad E_{(t,t+10)} = \frac{Y_u(t,t+10)}{r(t,t+10)}$$

Using elasticity coefficient, the capability of all urban point of the province, including the mediate city of Bonab, to attract more population is studied. Elasticity scale is any

number near one or even bigger than that. n that. From 1986-2006 onwards, the elasticity coefficient of Bonab is more than 1 and this is due to urbanization, decreased population of the villages and increased services as the result of increased investment in the area. This is bigger than the elasticity coefficient of the first city of province and it shows that Bonab is more flexible and attracts more immigrants and 40 percent of total increase in the population of Bonab in this period is due to the immigrants and their off springs but for a 5 year period (2006-2011) this number is decreased to less than 1.

Table 4. Elasticity Of Bonab For 2006-2011

City	Average population increase (percent)			Elasticity coefficient		
	1986-1996	1996-2006	2006-2011	1986-1996	1996-2006	2006-2011
province	1.97	1.72	1.24	-	-	-
Tabriz	2.60	1.62	1.34	1.05	0.94	1.08
Bonab	2.42	1.94	0.84	1.23	1.13	0.67

### Evaluating economical functioning of mediate city of Bonab

#### Location quotient method

It is one of the most common methods of analyzing interregional relations and procedures, this also is a mean to compare relative share of an action in the region with its relative share in national level (Masomi, 2006). This economy growth theory emphasizes basic and none basic activities.

$$(1) L.Q = \frac{\frac{TNi}{TNa}}{\frac{Cni}{CNa}}$$

Location quotient in agricultural sector at Bonab for 2006 and 2011 are 1/24 and 1/22 respectively. Because of population growth of Bonab during these two cities, work force supply has increased and a considerable part of this has got employed. This city has got basic conditions in agriculture and exports services to the regions under itself. Location quotient of industry sector for 2006 and 2011 are

respectively 0.76 and 0.78 respectively. This shows none basic form of the sector. Compared to other cities, Bonab has more progress in industry; it has got a power station, the biggest private steel company in Middle East and big, medium and small industries, but the workers in this city are not local (mostly coming from Tabriz, Maragheh, Azar shahr, Ajab Shir, Malekan and etc.) and from neighbor provinces (Miandoab, Mahabad and etc.) who are not resident in this city even though this city has gone towards basic conditions. In service sector, location quotient during 2006 and 2011 for Bonab are calculated to be 1/40 and 1.01 respectively, while the city has got basic conditions and exports services to the regions under its dominance. This is due to the academic, scientific and geographical nature of the city (table 5).

Table 5. L.Q (location quotient) of Bonab at 1986-2011

cities		2006	2011	L.Q	
				2006	2011
Bonab	agriculture	11271	11560	34.1	32.1
	industry	11256	10757	76.0	78.0
	service	18292	19344	1.40	1.10
	total	40819	41655	-	-
All cities of the province	total	1162108	1155221	-	-

### Izard Graphic Length-Width Model

This model is a method to analyze economical conditions in order to identify and predict the share of economical sectors of the city or region compared to national level. In this method, economy growth rate in different economical sectors is calculated while taking two times census on a total and national basis into account.

Comparing economic performance of East Azerbaijan province and Bonab for 2006-2011 signifies that generally agricultural sector growth in both levels is more than the average

growth of city and province. This is because of the fact that economy of Bonab is mostly based on agriculture and employment. Industry sector has less growth rate in this city compared to the average growth rate. This difference in percentage for Bonab is 3.5 percent and for the region is 2.1 percent. Service sector of Bonab is 3.6 percent more than average growth of the city. Among three sectors, service stands at the highest level at Bonab. Both the East Azerbaijan province and Bonab have high service growth and low industry growth in common.

Table 6. quantitative variations of different economical sectors of Bonab and country for 2006-2011

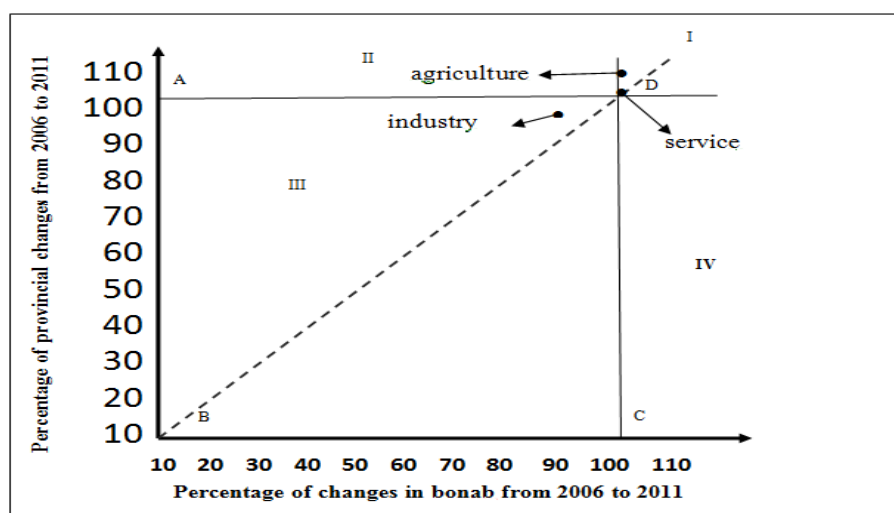
Economy sectors	Bonab			Province		
	Number of employed people for 2006	Number of employed people for 2011	Variation percentage 2006-2011	Number of employed people for 2006 (in thousands)	Number of employed people for 2011 (in thousands)	Variation percentage 2006-2011
agriculture	11271	11560	102.6	237170	243595	102.7
industry	11256	10757	95.6	415485	384175	92.5
service	18292	19344	105.7	499566	534338	107
total	40819	41661	102.1	1155221	1162108	100.6

Graph 3 which is traced based on table 6 shows the fact that agriculture and service sectors in both urban regions of the province as well as Bonab is in better positions compared to Bonab.

Industry sector in both urban regions of the province as well as Bonab is in lower position compared to economy sector. A significant point about the following Coordinate axes is the angle that is created by the diagonal of angle curve B with the vertical axis. If the created angle is equal to 45 degrees, then there is coordination between the macro economy growth and the regional one. If the angle is 4 degrees, then it shows less regional economy growth than national (macro) economy. In case created angle is more than 45 degrees, there

seems the regional economy growth is more than the average national (macro) economy growth. By considering the created angle in graph 3 and comparing quadrilateral of ABCD in which the length AB is almost equal to BC hints the economy concept that there is a balance between economy growth of Bonab and other urban points of East Azerbaijan province. Average economy growth of Bonab in this decade is 4.5 percent more than average economy growth of the province (table 6).





Graph 3. the position of economy sectors of Bonab and East Azerbaijan province

### Share-Shift model

This is one of the most common analyzing and predicting models. It is used to analyze and predict economical and employment conditions in geographical areas which are smaller than regions but bigger than cities. This model studies the ratio of growth difference of the economy sectors of the city compared to the growth of the sectors in provincial and national economy level (Ziari, 184, 2004). This analysis is a fairly simple technique that tries to identify some factors leading to growth difference and consequently difference in entrepreneurship facilities, of course this model only seeks to find the reasons behind the difference in the region growth ratio.

General structure of the model is as follows:

$$\begin{aligned}
 (1) \quad A &= \frac{E^{85} R}{E^{75} R} - 1 \\
 (2) \quad B &= \frac{E^{85} R}{E^{75} R} - \frac{E^{85} R}{E^{75} R} \\
 (3) \quad C &= \frac{E^{85} Li}{E^{75} Li} - \frac{E^{85} Ri}{E^{75} Ri} \\
 (4) \quad E_{Li}^{75-85} &= A + B + C
 \end{aligned}$$

As per the conducted calculations in table 7, it is calculated that the provincial economy growth during the years 2006 to 2011 is equal to -0.0241. The comprehensive denotative survey of all sectors signifies that during the given decades, agriculture has made the highest employment in both the provincial and city level while the coefficient of province and city are positive (coefficient of B is positive and coefficient of C is negative) and this is the winner of the economy sector. In industry sector, decreased employment in provincial level and increased employment in city level (coefficient of B is negative and coefficient of C is positive), this sector is the winner of the integrated economy. Service sector has increased employment in both provincial and city levels; it has made the highest employment opportunities compared to other sectors. The coefficient of both levels is positive (coefficient of B is positive and coefficient of C is also positive), so it is called as the winner of economy sector.

Table 7. calculation and analysis of sectorial Share-Shift of Bonab in the economical structure of the province

Serial	Economy sectors	Province		City/Town		A	B	C	A+B+C
		2006	2011	2006	2011				
1	agriculture	237170	239858	11271	11560	-0.0241	0.0354	0.0143	0.0256
2	industry	415485	380204	11256	10757	-0.0241	-0.0674	0.0471	-0.0444
3	service	499566	507307	18292	19344	-0.0241	0.0369	0.0420	0.0548
4	total	1155221	2736911	40819	416161	-	-	-	-

## Conclusion

As it is stated, the main aim of this study is to study the role of Bonab, as a mediate city, in regional development of the East Azerbaijan province. According to the conducted calculations and through analyzing the tables, all about the population is known and Bonab as well as Marand were only identified as mediate cities having more elasticity coefficient and attracting more population due to their special geographic and transportation conditions.

Entropy results show the fact that in case of ignoring populational functions of Bonab and other mediate cities, in all four periods of 1986, 1996, 2006 and 2011 East Azerbaijan province will get far from the populational balance in the city centers. Results of Rank-Size logarithm distribution also confirms the same, so that urban Rank-Size line slope in 2011 at the time of including Bonab and all other mediate cities are -1.47 and -1.470 and at the time of excluding them increase to -1.45 and -1.235 respectively.

The main economical functions of Bonab and other mediate cities of the province are considered to be agriculture and services. The trend analysis of the economical structures of the mediate cities shows the growth of agriculture in all the cities of the province except for Maragheh.

Industry sector has got descending trend in the province itself and in some cities like Marand and Mianeh as well, but in some other cities like Bonab it has got ascending trend. Mediate city of Bonab has got positive populational and functional effects in the city system of the

province but centralization of facilities, services and manufacturing factories in the single dominant city of the province (Tabriz) has made Bonab not to be able to function in its full potentiality. Uncontrolled growth of Tabriz, as the result of improper policies taken by the authorities during last years, has made the city centers to be locationally scattered, so that the far distance between Tabriz and other mediate cities caused cities with 250-500 thousand people not to be formed. This gap in the settlement hierarchy is one of the most important factors in the creation of province's imbalanced city system. To cope with this inequality and to reach a moderate regional development is only possible by taking systematic and locational approach while codifying development plans. Planning based on this approach should be in a way to spread development all around the province and to remove locational inequality from the city hierarchy. In order to reform this locational structure, decentralizing facilities and investment from Tabriz and directing them to big mediate cities is the best policy. By applying this policy, settlement gaps in city system of the province will also get over.

## Ethical considerations:

Following the principles of research ethics: In the present study, informed consent forms were completed by all subjects.

## Sponsor:

Conflict of interest: According to the authors, this article was free of any conflict of interest.

## References

- Amchaki, H. (2003). Mediate cities and their role in national development (1st ed.). Tehran, Iran: Center of Architecture and Urbanism Studies of Iran. (in Persian)
- Azimi, N. (2002). Urbanization analysis and basic concepts of urban system. Tehran, Iran: Nika Publications. (in Persian)
- Behfroz, F. (1998). Urbanization in Iran. Tehran, Iran: Agah Publications. (in Persian)
- Boly, J.-C., & Rabinovich, A. (2004). Intermediate cities in Latin America: Risk and opportunities of coherent urban development cities (Vol. 21). [Publisher unknown].
- Brown, M., & Chen, L. (2020). Regional urban balance and the emergence of mediate cities. *International Journal of Urban and Regional Research*, 44(3), 350–370.
- Budget Planning Organization. (1985). Basic land analysis study (1st ed.). Tehran, Iran: [Publisher unknown].
- Dauglass, M. (1998). A regional network strategy for reciprocal rural urban linkages. TWPR.
- Fanni, Z. (2003). Small city as an approach to regional development. Tehran, Iran: State Municipalities Organization. (in Persian)
- Filho, O. B. A. (1985). Middle city size & Brazil's territorial planning in Yadav. [Location unknown]: [Publisher unknown].
- Garcia, R. (2020). Sustainable regional development through mediate cities: Evidence from Latin America. *Cities*, 101, 102689.
- Hekmatnia, H., & Mosavi, M. J. (2011). Application of model in geography with a focus on regional and urban planning. Tehran, Iran: Elme Novin Publications.

- Hesamian, F., et al. (1998). Urbanization in Iran. Tehran, Iran: Agah Publications. (in Persian)
- Iran Statistics Center. (1986–2011). Results of the public census of East Azerbaijan Province. [Publisher unknown]. (in Persian)
- Jones, A., & Lee, B. (2018). Migration and urban balance in developing regions (p. 112). London, UK: [Publisher].
- Kanzmn, C. (1985). The idea of encouraging the middle of cities as key in determining a successful policy in regional planning [Translator information not provided]. [Publisher unknown].
- Masomi Ashkori, S. H. (2006). Principles of regional planning (3rd ed.). Tehran, Iran: Peyam Nour Publications. (in Persian)
- Nazarian, A. (2000). Urban geography of Iran. Tehran, Iran: Peyam Nour Publications. (in Persian)
- Richardson, H. W. (1977). City size and national spatial strategies in developing countries [World Bank Staff Working Paper]. Washington, DC: World Bank.
- Rondineli, D. A. (1985). Applied methods of regional analysis: The spatial dimension of development policy. Boulder, CO: West View Press.
- Rondinelli, D. A., & Ruddle, K. (1978). Urban function and rural development: An analysis of integrated spatial development. [Publisher unknown].
- Rozbehan, M. (2004). Basic concepts of economy development. Tehran, Iran: Taban Publications. (in Persian)
- Sabagh Kermani, M. (2001). Regional economy. Tehran, Iran: Samt Publications. (in Persian)
- Sarafi, M. (2000). Principles of regional development planning. Tehran, Iran: Management and Planning Organization.
- Shokoie, H. (1998). New attitudes in urban geography. Tehran, Iran: Samt Publications. (in Persian)
- Smith, J. (2020). Urbanization patterns in the 21st century. New York, NY: Routledge.
- United Nations. (1994). World urbanization prospects: The 1994 revision. New York, NY: United Nations.
- Weaver, C. M. (1990). Urban system theory and third world development. *Journal of Urban Affairs*, 13, 125.
- Wheeler, J. O., & Muller, P. O. (1986). Economic geography. Canada: John Wiley & Sons, Inc.
- Zangi Abadi, A., Hekmatnia, H., & Mosavi, M. N. (2005). The role of mediate cities in locational and regional arrangement of East Azerbaijan Province. *Journal of Geographical Thoughts*, 1, [page numbers unknown]. Zanzan, Iran: Zanzan University Publication.
- Zarrabi, A. (2000). Future of the cities: Urban stable development planning [Collection of articles from the first congress on stable development in urban areas]. Tabriz, Iran: Tabriz University. (in Persian)
- Zebardast, E. (2004). Size of the city (1st ed.). Tehran, Iran: Housing and Urbanization Ministry. (in Persian)
- Ziari, K. (1999a). Modern cities planning. Tehran, Iran: Samt Publications. (in Persian)
- Ziari, K. (1999b). Principles of regional planning. Yazd, Iran: Yazd University Publications. (in Persian)