The Role of Small Urban in Rural Development: A Case Study in Iran

Zahra Sharifinia

Department of Geoghraphy and Urbun Planning, Zabol Branch,
Islamic Azad University, Zabol, Iran

Abstract: In Iran by performing the policy of changing villages to cities, many rural regions have been changed to cities especially during the last two decades. The current town of Mohammadabad in Zabol city, Sistan and Bluchestan province, is one of the towns which have been changed into a town in 1999. The purpose of this paper is to study the role and function of Mohammadabad town as a small civic center in the development of rural regions in its surrounding. In this direction by choosing 6 functions in the form of 35 variables and using network analysis method we have studied and compared the current affairs and relations in the understudied village in two intervals before and after Mohammadabad becomes a town. The results of studies indicates that Mohammadabad town as a central place, have played an important role in giving services to the regions in its surrounding which has consequently caused to reduce the dependence of rural regions to city center.

Key words: Small Town ᐧ Network Analysis ᐧ Rural Development ᐧ Central Location ᐧ Mohammadabad town

INTRODUCTION

The less-developed countries have raised this issue that the development of the small and medium towns cannot be regarded as a gradual and automatic process. On the contrary, they get rapid spatial distribution through well-thought and purposeful policies with a well-accepted and appropriate prospective outlook. Nowadays, the relations of the cities and villages have expanded diversely due to all the vast technological, commercial and social revolutions, especially the ones in transportation and road links. These relations manifest themselves in terms of population, goods, doctrines, capital, information and creativity. In the past few decades, there have been many strategies proposed for rural development one of which that has a spatial approach, is establishing and strengthening the small towns and town-villages [1, 2]. Within our developing world, urban concentration has caused so many problems in large cities of which dense population (crowdedness), immigration, lack of accommodation, unemployment and environmental destruction could be brought up as examples [3]. Consequently, the urban and regional analysts have devoted their attention to the development of small and medium towns as a necessary strategy to overcome the imbalance caused by the development of

large cities. As long as the growth is limited to some certain cities, these cities are more inclined to more development and as a result, the smaller urban zones will be subject to less gradual transformation and growth [4].

Generally, the rural and urban development will be fulfilled through bilateral links and interactions. On this basis, in development planning processes, the strengthening and growth of the large villages (small towns) could not be ignored. In fact, these centers provide facilities and services to their surrounding areas and therefore, could play an integral role in developing rural regions [5]. In an overall outlook, the small towns could be regarded as centers, which play an important role in reinforcing the incentives for rural growth and development of their region of interest [6]. There is no hierarchical function for the urban network in Iran and the residential centers, spatial distribution and population volume do not follow a hierarchical functional system, therefore, the urban network keeps evolving in centricity [7]. On the other hand, if the goal of development in a country is the development of all non-urban regions in order not to only have cities developed but also rural areas, then one major effort would be taking the small towns into consideration and to assess and appoint them for regional development [8].

Corresponding Author: Zahra Sharifinia, Department of Geoghraphy and Urbun Planning,
Zabol Branch, Islamic Azad University, Zabol, Iran.

Based on this policy, setting up new towns, reinforcing planetary towns and transforming large villages into small towns have been implemented by urban and regional planners in order to decentralize and depolarize large cities and to revive the urban hierarchy. In the past few decades, many rural zones have been transformed into urban zones through the policy of turning large villages into towns and that is why the number of urban zones has increased to more than 1000 in Iran [9].

In 2012, the number of urban zones has reached to 39 in Sistan and Bluchestan province and most of these zones had been originally formed from rural regions [10]. The town of Mohammadabad (the centre of Mohammadabad rural district) is one of these rural centers which have been changed to city in 1999 [11].

Concerning the goals of changing large villages to towns, the present paper has been brought forth for discussion to study the function of Mohammadabad city in the development of surrounding villages and also to give an answer to this question: could Mohammadabad city, as a small town, play a key role in providing services for the rural regions in its surrounding and consequently reduce the dependency of these regions to the center of township?. In this direction, the function of Mohammadabad city in providing services for villages of rural district has been analyzed by using network analysis method and comparing the results before and after that.

MATERIALS AND METHODS

The research method is based on the application objective and descriptive data (non-experimental) collected via survey. The method for collecting information and data is the library and field method. In the field method the means for collecting information are questionnaires.

Through using network analysis methodology in this research, the most efficient functions within this rural district as well as the interactions and links between the town of Mohammadabad and its surrounding villages were studied before and after transforming of this village into a town. In network methodology, the binary pair of 0 and 1 is used to refer to the existence or non-existence of relations between two factors or two residencies within one complex. These functions are:

- Clinical/ Medical,
- Educational/ Cultural,
- Telecommunicational/communications, 4-Agricultural

- Commercial/ Services
- Political/Administrative.

Each of these functions was evaluated based on the most functional parameters (35 parameters). Of the region which are as follow: Clinical/Medical function includes: Clinical Medical Centre, Clinical House, Physician, Medical Assistant or Midwife, Clinical Assistance, Clinical Trainee, Dentistry, Pharmacy.Educational/Cultural function includes: Primary School, Boys Elementary School, Girls Elementary School, Males' High School, Females' High School, Males' Gymnasium, Females' Gymnasium, Public Library. Telecommunication/ communications functions includes: Post Box, Post Office, Telecommunication Office, Access to Public Transportation, Access to Newspapers and Magazines. Agricultural functions includes: Farming Machines Repair Center, Shopping Center of Surplus Harvest, Agricultural Implements Stores. Commercial and civil includes: Cooperative Stores, Home Appliance Stores, Building Materials Stores, Stationary Stores, Food Stores, Gas Station, Post Bank. Whereas, Political and Administrative function includes: Islamic Council of Village, Basij Centre, Police Office and Corporation Company of Village.

Network Analysis Method: In regional science different methods have been used and suggested for analyzing patterns relations and hierarchies of human residential places. One of these methods is the method of social network analysis [12]. Researchers use statistical models based on network analysis for about 1360 years. The purpose of these models is a quantitative testing of the specifications of social relations among factors and components of a specific network. The range of these applications is from the studies on action and reaction between personality's internal relations friendship and leadership studying the relations among groups and the studies of society's political behavior and power sector. This method is used to determine the key residential place among different kinds of residential places by considering the number of internal dependencies in one system [13]. This method should:

- Describe the dependence and relations among residential places in one region.
- Determine the degree and importance of a residential place or a set of residential places.
- Indicate the sensibility of the structure of a residential place in the absence of some specific residential places.

It seems that network analysis method proper for all above three mentioned points. The network analysis method is widely used in social sciences and transportation researches but it has been rarely used in determination of key or vial residential places.

The foundation of network analysis is based on analytical data framework, which is dependent to information and hypothesis. Data may include data in the relations as well as action and reaction among people or individual or group attitude. The connection and dependence of two pair is called relation. the relation of data are selected by means of personal studying and negotiating the action and reaction with others. The relations are just between factor pairs and these pairs or binaries are proper units for the analysis of relations.

For example, two cities connected with a road between them and shops with the customer are kinds of pairs. The data in social transaction are put in a matrix, which is called social matrix. The social matrix indicates sender factors to receiver factors. A social matrix is not a close frame however, the sender and receiver may be different or the same.

There are two basic kinds of relations in network analysis:

• Bilateral or evaluated
• Direct and indirect

Bilateral relation (0-1) is the existence of non-existence of relation between two factors or residential places in a residential complex and a value relation concerns intensity and abundance of a relation besides its presence or absence.

A direct relation has a clear origin and end. An indirect relation is not clear in relation with the origins of flow. An indirect relation is usually indicated as an arrow. A line between related factors is not specified by arrowhead. An arrow usually indicates a direct relation specified by arrowhead at the end. For example, if village A sends its student to village B the direction of education relation is from A to B.

Based on social network analysis, nodes are very important. There are some criteria to measure the importance of a node, which includes local centralization, Local Credit and General centralization. *Local centralization:* Reflect the number of direct transfers and therefore is measured by the external degree of each factor.

Local Credit: indicates the number of direct receiving and is measured by internal degree for each factor. Whenever the internal degree is zero the and external degree is not zero, a factor is called origin or transfer; which means the local of rows is zero but the linear total has a non- zero factor. If external degree is zero and internal degree is non-zero the factor is called receiver. An isolate factor is the one with both internal and external degree of zero. Following digraph and matrix are a clear example that specifies the relation four nodes:

$$A \rightarrow B \rightarrow C$$
$$D$$
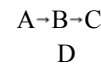
As we see, A is transferor, B is vector, C is receiver and D is as we see, A is transferor, B is vector, C is receiver and D is isolated factor. When there is no arc to attach a node to other nodes of the network, the node is called isolated one. The adjacency Matrix for this diagraph is as follows which indicates that A is in relation with B, B is in relation with C, C has no relation with outside and D has no relation with others and is an isolated node (Table 1).

General Centralization: if a factor has the shortest distance from other factors, it is called central factor. The distance between factors is measured by nearness. Playing the role of being centre, it is measured by the mean.

Nearness is the opposite of distance. The less the distance of i with other factors is, the more it is near to centre, from mathematical point of view we have:
In which is the shortest distance between i and j in the network and N is the size of network. This criterion depends on the size of network [14].

Case Study: Mohammadabad is one of the rural districts of Mohammadabad district located in Zabol city; the center of which is Mohammadabad town. According to the census of 2006, the rural district of Mohammadabad has had a population of 14489 people; 2175 in Mohammadabad town and 12314 in other rural places [15]. Fig. 1 indicates the under study region.

Table 1: The relation between residences of assumed nodes

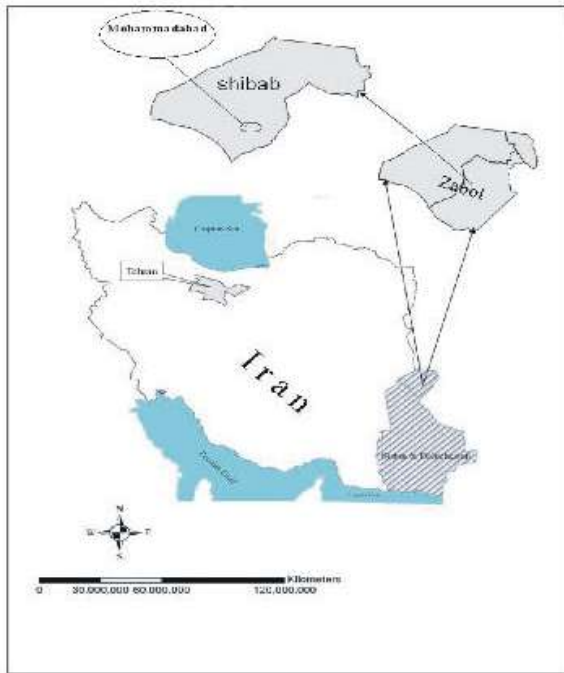|	A	B	C	D
A	0	1	0	0
B	0	0	1	0
C	0	0	0	0
D	0	0	0	0

Fig. 1: The area of the under-study rural district Source: Iran statistic center 2012.

RESULTS

In order to study the functional role of Mohammadabad (as a small urban center) in giving services to rural regions of the under study rural district,

using network analysis method. We have studied the flows and service relations which are under study (Clinical Medical, Educational Cultural, Telecommunicational Communication, Agricultural, Commercial Services, Political Administrative) in Mohammadabad rural district in two sections before and after Mohammadabad becomes a town. The sum up of all present flows and service relations of the under study region in two chronological sections of Tables 2 and 3 and Fig. 2 and 3 indicates that:

During the first section almost all of the villages of Mohammadabad rural district have been linked to the city of Zabol with the internal degree of 18. However, the village of Mohammadabad with the internal degree of 5 had the least interactions among the rural district.

Unlike the first section in which Mohammadabad has been dependent to Zabol for under study services, during the second section it had no dependency to Zabol (the external degree is zero after becoming a town). Considering flows and relations, Mohammadabad city receives no services from rural points during first and second sections.

During the first section considering the centralization of all services in Zabol, rural regions of the rural district of Mohammadabad had the most dependency to this city and villages Dolat Abad, Firuzi, Dehkul, Hamzah Abad and Abasiyeh (with external degree of 2) have been dependent to the present town of Mohammadabad besides the city of Zabol. But during the second section by centralizing these kinds of services in Mohammadabad

Table 2: Summation and analysis of all flows and relation in the studied zone before becoming a town Mohammadabad.

Residential places	Gaznum	Sadaki	Divaneh	Malek Abad	Dolat Abad	Baghak	Firuzi	Kakhn	Dehkul	Bahram Abad	Dehmir	Zolfaghari	Zur Abad	Zeyral Abad	Hamzeh Abad	Abasiyeh	Ebrahim Abad	Mohammadabad	Zabol	External degree
Gaznum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Sadaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Divaneh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Malek Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Dolat Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Baghak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Firuzi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Kakhn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Dehkul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Bahram Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Dehmir	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Zolfaghari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Zur Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Zeyral Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Hamzeh Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Abasiyeh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Ebrahim Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Mohammadabad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Zabol	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Internal degree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	18	23

Table 3: Summation and analysis of all flows and relation in the studied zone after becoming a town Mohammadabad.

| Residential places	Gazmum	Sadaki	Divaneh	Malek Abad	Dolat Abad	Baghak	Firuzei	Kelcha	Dehkul	Bahram Abad	Dehmir	Zolfaghari	Zur Abad	Zeynal Abad	Hamzeh Abad	Abasiyeh	Ebrahim Abad	Mohammad Abad	Zabol	External degree
Gazmum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Sadaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Divaneh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Malek Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Dolat Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Baghak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Firuzei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Kelcha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Dehkul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Bahram Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Dehmir	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Zolfaghari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Zur Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Zeynal Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Hamzeh Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Abasiyeh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Ebrahim Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Mohammadabad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zabol	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Internal degree	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	2	17
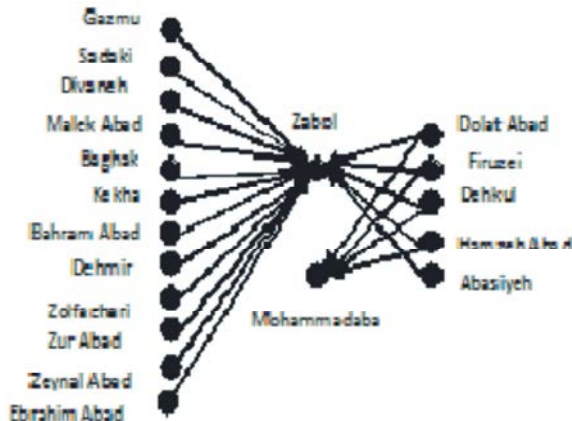
Fig. 2: Diagrams of flows and relations in the studied zone before Mohammadabad became a twon.
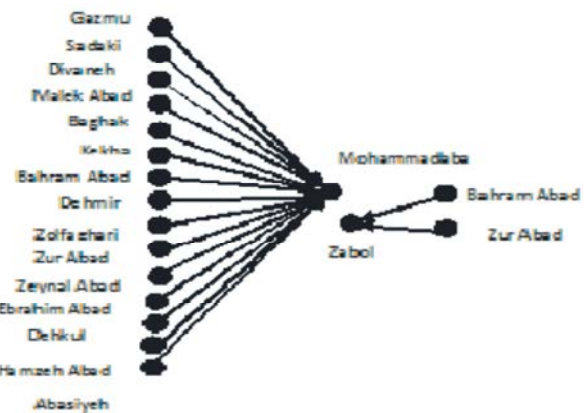

Fig. 3: Diagrams of flows and relations in the studied after Mohammadabad became a twon.

(unlike first section). The dependency of the residential places in rural district to Zabol has been decreased and just the villags of Bahram Abad and Zur Abad are dependent to the city of Zabol considering their low distance to Zabol and other rural regions are only dependent to Mohammadabad (Fig. 2 and 3). In other words before becoming a town the internal degrees of Zabol and Mohammadabad have been accordingly 5 and 18. After becoming a town, it is observed that the internal degrees of Zabol and Mohammadabad are accordingly 15 and 2.

During the first section except for Mohammadabad that had given services to five village, the rest of villages in the studied rural district not only give services to other residential places but were not capable of providing services even to their inhabitants (having internal degree of zero).

Also, considering that the total of rows and columns of Tables (internal and external degree) is not zero during both sections before and after becoming a town. It is observed that there is no isolated and distinct place during each section in the studied zone and these residential places are the sender of services to other regions or receive services from other regions. Studying the percentage of density in each operation based on Table 4 indicates that the density of operations in comparison with the previous section has been improved to some extent and the reason is the establishment and

Table 4: The density of operations in the studied region before and after Mohammadabad becoming a town.

Operation	Total of rows		Total of possible relation		Density(percent)	
	Before Becoming a town	After becoming a town	Before Becoming a town	After becoming a town	Before Becoming a town	After becoming a town
Clinical-medical	24	38	342	342	7.02	11.11
Cultural-educational	42	50	342	342	12.28	14.62
Telecommunication-communications	9	35	342	342	2.63	10.23
Agricultural	4	4	342	342	1.17	1.17
Commercial-service	19	34	342	342	5.55	9.94
Political-administrative	21	26	342	342	6.14	7.60
All flows	17	23	342	342	4.97	6.72

Table 5: Studying and comparing internal and external degree nearness the level of rural district before After Mohammadabad becoming a town.

Residential places	External degree		Internal degree		Total of distances to other resident places Before and After Mohammadabad becoming a town	Nearness before and After Mohammadabad becoming a town
	Before Mohammadabad becoming a town	After Mohammadabad becoming a town	Before Mohammadabad becoming a town	After Mohammadabad becoming a town		
Gazmum	1	1	0	0	12/294	0/081
Sadaki	1	1	0	0	11/941	0/084
Divaneh	1	1	0	0	11/646	0/086
Malek Abad	1	1	0	0	10/118	0/099
Dolat Abad	2	1	0	0	10	0/1
Baghak	1	1	0	0	11/176	0/089
Firuzei	2	1	0	0	9/118	0/110
Kekha	1	1	0	0	10/647	0/094
Dehkul	2	1	0	0	7/882	0/127
Bahram Abad	1	1	0	0	9/529	0/105
Dehmir	1	1	0	0	11/470	0/087
Zolfaghari	1	1	0	0	10/353	0/096
Zur Abad	1	1	0	0	15/706	0/064
Zeynal Abad	1	1	0	0	16/176	0/062
Hamzeh Abad	2	1	0	0	12	0/083
Abasiyeh	2	1	0	0	9/588	0/104
Ebrahim Abad	1	1	0	0	14/529	0/069
Mohammadabad	1	0	5	15	7/647	0/0131
Zabol	0	0	18	2	11/706	0/085

Table 6: The rate of facilities and services in the residencies of Mohammadabad in two periods of before Mohammadabad transformation into a town.

Residential places	Clinical-medical							educational-Cultural								Telecommunication-communications					Agricultural			Commercial-service							Political-administrative			
	CMC	CH	P	MAM	CA	CI	D	H	PS	BES	GES	MHS	FHS	MG	FG	PL	PB	PO	IO	API	ANM	FMRC	SCSH	ALS	CS	HAS	BMS	SS	FS	GS	PB	ICV	BC	PO	CCV
Gazmum	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Sadaki	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Divaneh	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Malek Abad	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Dolat Abad	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Baghak	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Firuzei	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Kekha	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Dehkul	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0
Bahram Abad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Dehmir	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Zolfaghari	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0
Zur Abad	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Zeynal Abad	0	1	0	0	0	1	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	1	0	0	1	1	0	1
Hamzeh Abad	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abasiyeh	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Ebrahim Abad	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Mohammadabad	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	1	1	1	1	1	1	1	0	1	1	1	0	1

dispersion of these services in rural regions of the rural district and consequently the relations among residential places has been increased comparison with previous section.

Studying the percentage of density of all flows in two sections before and after Mohammadabad becoming a town shows the density of flows in the first section is 4.97 and in the second section are 6.72. Therefore the comparison of density in both sections indicates the improvement of density of flows and the increase of relations between residential places of the studied region (Table 4). Studying the value of centralization (nearness)

Table 7: The rate of facilities and services in the residencies of Mohammadabad in two periods of after Mohammadabad transformation into a town.

Residential places	Clinical-medical									educational-Cultural						Telecommunication-communications					Agricultural				Commercial-service						Political administrative				
	C.M.C	C.H	P	M.A.M	C.A	C.T	D	PH	P.S	B.E.S	G.E.S	M.H.S	F.H.S	M.G	F.G	P.L	P.B	P.O	T.O	A.P.T	A.N.M	F.M.R.C	S.C.S.H	A.I.S	C.S	H.A.S	B.M.S	S.S	F.S	G.S	P.B	I.C.V	B.C	P.O	C.C.V
Gazmum	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Sadaki	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diraneh	0	1	0	0	0	1	0	0	0	1	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0
Malek Abad	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0
Dolat Abad	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Baghak	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0
Firuzei	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Kakha	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0
Dehkul	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0
Bahram Abad	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	1	0	1	0	1	0	0	0
Dahmir	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0
Zolfaghari	0	1	1	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0
Zur Abad	0	1	0	0	0	1	0	0	1	1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0
Zeynal Abad	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	1	0	1	0	1	1	1	1	1	0	1
Hamzeh Abad	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abasiyeh	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Ebrahim Abad	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0
Mohammadabad	1	1	1	1	1			1	1	1	1	1	1			1	1	1	1						1	1			1		1	1	1		1

Table 8: Abbreviations used in the manuscript are tabulated here

C.M.C	Clinical Medical Centre	F.H.S	Females High School	C.S	Cooperative Stores
C.H	Clinical House	M.G	Males Gymnasium	H.A.S	Home Appliance Stores
P	Physician	F.G	Females Gymnasium	B.M.S	Building Materials Stores
M.A.M	Medical Assistant or Midwife	P.L	Public Library	S.S	Stationary Stores
C.A	Clinical Assistance	P.B	Post Box	F.S	Food Stores
C.T	Clinical Trainee	P.O	Post Office	G.S	Gas Station
D	Dentistry	T.O	Telecommunication Office	P.B	Post Bank
PH	Pharmacy	A.P.T	Access to Public Transportation	I.C.V	Islamic Council of Village
P.S	Primary School	A.N.M	Access of Newspapers and Magazine	B.C	Basij Centre
B.E.S	Boy Elementary School	F.M.R.C	Farming Machines Repair Center	P.O	Police Office
G.E.S	Girl Elementary School	S.C.S.H	Shopping Center of Surplus Harvest	C.C.V	Corporation Company of Village
M.H.S	Males High School	A.I.S	Agricultural Implements Stores		

in the section before and after Mohammadabad becoming a town based on Table 5 indicates that in both section in the studied region, Mohammadabad has had a more closeness to other residential places. Table 6 and 7 depict the level of facilities and services in the residencies of Mohammadabad in the two periods of before and after Mohammadabad transformation. In this Table, the relations in six different forms including 35 parameters are studied: 1- Clinical-Medical, 2- political-Adminstrative, 3- Educational Cultural, 4- Telecommunicational communications, 5- Commercial Services and 6- Agricultural. As it is clear in the Table, the external degree of clinical-medical function has increased from 24 (before transformation) to 38 (after transformation) and the concentration of function has increased from 7.02 to 11.11. The political/ administrative function has increased from 21 to 26 in its external degree and its concentration has moved from 6.14 to 7.60. The external degree of educational-cultural function has increased from 42 to 50 and its concentration from 12.28 to 14.62. The external degree of telecommunicational communications function has increased from 9 to 35 and its concentration from 2.63

to 10.23. The external degree of commercial services function has increased from 19 to 34 and its concentration from 5.55 to 9.94. The overall view on all functions shows the external degree has increased of 17 to 23 and the concentration from 4.97 to 6.72.

CONCLUSIONS

Utilizing network analysis methodology, this research has been an attempt to analyze the relations and functions of concern before and after the transformation of Mohammadabad into a town in order to study the role and function of Mohammadabad in developing the surrounding villages. The analysis shows that the transformation of Mohammadabad into a town has had a positive effect on providing services to the other residencies such as the residencies of Mohammadabad. Before the transformation of Mohammadabad into a town, it was not able to provide services to the villages and therefore, all its surrounding residencies in addition to itself were dependent on Zabol which is located 15 km away from the Mohammadabad zone.

In this phase, villages Dolat Abad, Firuzi, Dehkul, Hamzah Abad and Abasiyeh (with external degree of 2) have been dependent to the present town of Mohammadabad besides the city of Zabol.

But during the second section by centralizing these kinds of services in Mohammadabad (unlike first section), The dependency of the residential places in rural district to Zabol has been decreased and just the villages of Bahram Abad and Zur Abad are dependent to the city of Zabol considering their low distance to Zabol and other rural regions are only dependent to Mohammadabad. As a result, through analyzing the obtained data and the regional studies in the zone of our concern, we are witnessing that by transforming Mohammadabad into a small urban spot (central location), this city has gained a key role in providing services to its surrounding villages as well as decreasing the dependency of the concerned villages on Zabol.

Furthermore, the rural concentration analysis of functions and relations shows that this rate had been 4/97 before the transformation of Mohammadabad into a town and 6.72 after the transformation. This fact simply indicates more links among the rural residencies within the second period.

Thus, it could be concluded that the town of Mohammadabad as the central zone could establish the maximum level of contact to its surrounding residencies and consequently plays an integral role as a catalyst for rural development and an obstacle to stand against the immigration to larger cities.

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