Identification Spatial Effects of Space Economy in Peripheral Areas of Sanandaj

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ABSTRACT – *Areas around cities are crystallization space organization with natural, social, economic and physical revelation in geographic context to another that inform in context of dynamic interaction of human and environment within economical and social system. In capitalism organizations space formation in order to goals of circulation and accumulation capital and in finally adapted to administrative and political structure and economic base each geographical place in priorities of accumulation of capital will form forms, structure and functions of different. The type of this research is descriptive-analytical and is based on the process of combining multiple methods. Therefore, this research attempt to evaluate the spatial effects of space economy revolution in the peripheral areas of Sanandaj. In this regard, It were identified criteria for space economy revolution in four dimensions social, economic, physical – environmental and infrastructure to identify the most important spatial effects of space economy revolution in the study area, with using multi – criteria decision analysis methods FTOPSIS in each dimension have been recognized. The results show that of the most important spatial effects of Space Economy Revolution in the economic sector include rising land prices, buying and selling land for farming and gardening, reduction in the area under cultivation, increased investment in real estate sector (buy and sell housing). The most important social effects of Space Economy Revolution in social dimension are rural population growth, increasing rural – urban migration and most important physical – environmental effects of Space Economy Revolution in the peripheral villages of Sanandaj include garden and agricultural land conversion to second home, destruction of natural landscapes of villages, and the spread of illegal construction. And in the infrastructure facilities and services dimension, the effects of Space Economy Revolution in the peripheral villages of Sanandaj include improving infrastructure of services, improving access to communication services and development of financial services such as Post Bank and Corporations.*

Key words: SPACE ECONOMY, REVOLUTION, SPATIAL EFFECTS, SANANDAJ CITY

I. Introduction

Space is actually an objectivity resulting from mutual interactions of individuals and human groups in a place, or in other words, it is the consequence of interactive functions of two natural – ecological and socio – economic environments. Space can thus be considered as a kind of social production in a place. Since space is composed of related components, it could be regarded as a system and because this system is a spatial reality, so one can speak of spatial system. The study of space is always accomplished on the basis of a certain scale, including large – scale space (global, country or regional),

medium scale (regional, local, urban and rural), or small – scale (village, farm, neighborhood, etc systems...) (Saedi, 2009).

In order to understand space revolution, it is essential to understand several factors affecting space organizing and production. Space economy revolutions are influenced by a variety of factors at the national, regional and local level, which lead to the formation of different special effects in different geographical areas.

In recent years, as a results of rural – urban migrations (and vice versa over the last decade), metropolitan and urban areas in Iran have experienced incomplete and undeveloped urbanization resulting from oil capitalism (Saedi & Hosaini, 2007: 71-90). In most cases, the level and scope of uncontrolled urban growth have caused considerable concerns among experts and informed citizens.

It is obvious that uncontrolled urban growth and encroaching on the lands of peripheral villages, that give rise to significant changes in functional and space economy revolutions of the rural space result from diverse a phenomenon which is traceable by a correlated chain of events.

In the systems, which their political and economic decisions to achieve specific goals rely on oil revenues, much space economy revolution in peripheral villages is traceable from national to regional level and finally at the local level or it returns to the fundamental backgrounds and its related trends. In this regard, the present study is to investigate the factors influencing space economy revolution and also its spatial effects in different aspects. The most important spatial effect in the study area will be recognized.

II. TEHORETICAL FOUNDATIONS

Space economy, spatial pattern of the economy (such as its distribution and location of its constituent activities) and the spatial flows between them such as population, goods, services and capital movements is called space economy (Afrakhteh, 2012) (Figure 1). In the capitalist systems, the concepts of space and its various applications is different. According to Marx, in a capitalist system space is a part of the production forces, which is placed alongside other production factors (knowledge, skills, labor, raw materials, technology, etc,..).
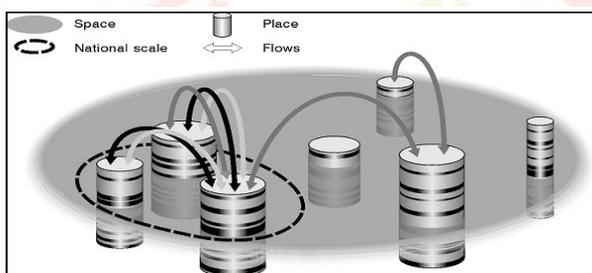

Figure 1: The Space and spatial flows

According to Cohen, the role of space as a production force, and thus as a fundamental element in capitalist mode of operation should be examined, and in such circumstances, of course, space property can provide an important position in the economic structure and create a specific space structures and forms (Cohen, 1978: 51). This can not only encompass specific economic sectors and dimensions, but also the totality of social spaces of human settlements. Because the special relations of capitalism embrace not only the plans and organizing production spaces, such as factories, workshops, and other activity centers, but also it encompasses spatial organization and differentiation the totality of urban space.

Therefore, the main philosophy of the capitalist systems, production and reproduction of space is based on the production and capital accumulation (production for production and accumulation for accumulation), which has tremendous impact on production and the organization of space. Therefore, in this system; space is the product of social relations and is organized within the framework of the political and economic relations (Ahmadi, 2017: 55).

The space can thus be considered as a form of social production in a place, and because space consists of connected components, it can be regarded as a system, and because this system is a spatial reality, one can speak of spatial system. The study and recognition of space is always accomplished on the basis of a certain scale, including large – scale space (global, country or regional), medium scale (regional, local, urban and rural), or small –scale (village, farm, neighborhood, systems, etc.) (Saedi, 2008).

The important aspect of the study of space and its development is conducted in the regional scale, where rural – urban relations are of the most important trends affecting the formation of regional spaces. The regional spaces are undergoing a fundamental changes and transformations resulting from the passage of time, the process of rationalization, and changes in people's livelihood, population growth, the use of technology, socio – economic programs and policies of governments in attention or inattention to any of these population centers (Nazarian, 2009: 210).

In order to understand space revolution, it is necessary to recognize the dominant ideology of planning, in its various dimensions, which is influential in organizing the space and production of space. Revolutions contributing space economy are influenced by different approaches, which has been developed and implemented in different time periods.

Planning is undoubtedly considered as a political activity, which stems from the dominant ideology of the society. During planning, planners apply different concepts of the public interests. They are always under pressure from government agencies or interest groups. Therefore, the geographical landscapes, which appear in the living space at the end stages of planning, are a symbol of the dominant political ideology of the society.

Therefore, planning in different ideologies creates different geographical features, and these different geographical

features represent the share and the role of interests in political ideology (Shokuie, 2003: 50). The political economy of the space is one of the new topics for dealing with this situation. According to geographers not only form and physical qualities are important in the process of space production, but also perceptions, beliefs, opinions, ideologies, cultural characteristics, level of awareness, the way of thinking, political economy, and cultural systems play effective role.

The political economy of space has a strong connection with different economic and social systems and thus each one of the liberal, conservative, radical and …. Systems have special effects of political economy on urban and rural spaces. It should be noted that dominant political economy of each region is not the only factor, but it is one of the determining factors in creating space. Thus, political economy is considered as an independent variable for space formation that has been proposed as a dependent variable, too (Piran, 1991: 70).

As mentioned before, planning by itself is a political activity that stem from the dominant ideology of the society, depending on the prevailing economic thinking is influenced by what schools and ideologies, space formation would be accepts different effects. So the dominant economic thinking in planning, which affects the shape of space formation represents the political economy of space. Accordingly, different socio – economic systems with their own ideology create geographically diverse landscapes.

In the capitalist systems, the purpose of space production is capital circulation and accumulation. In such circumstances, the economic and political structure of societies and the methods of decision making by governments to achieve this goal lead to space economy revolutions, and finally, in accordance with the political and administrative structure of different societies and the economic base of each location for capital accumulation priorities will be formed new forms, structures and functions (Figure 2).
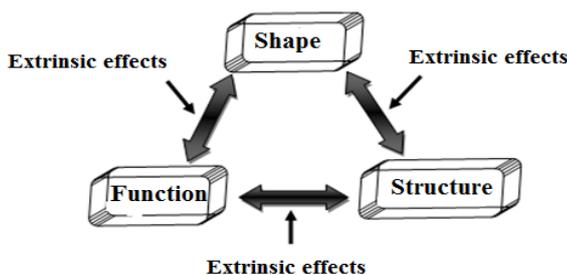

Figure 2: The main element of space, Source: (Ahmadi, 2017)

III. CASE STUDY

The study area of this research is the surrounding villages of Sanandaj City in Kurdistan Province (fig: 3). Kurdistan Province is hugged by the foothills of the Zagros Mountains and more than 82 percent of its area is mountainous. Consequently, 77 percent of rural settlements are located in mountainous areas (Statistical Center of Iran, 2007: 65).

Sanandaj city of Kurdistan province with an area of 2,906 square kilometers locates between 35 degrees and 1 minute to 35 degrees and 32 minutes of north latitude and 46 degrees and 18 minutes to 47 degrees and 16 minutes of east longitude from prime meridian and places in an average height above sea level in Kurdistan region in Zagros Mountains in central front bowed to southern province (Ahmadi et all, 2011: 6). The study area in this research is 22 villages including (Asaoleh, Salavat Abad, Doshan, Ghar, Gholian, Babariz, Dolat Abad, Khalichan, Barazan, Karjo, Killaneh, Dadaneh, Kani Meshkan, Karahsi, Anbarbazan, Khoshkavel, Serenjyaneh Sofla, Serenjyaneh Olia, Arandan, Navareh, Sorkheh Dezaj, Ajgarah, Sofian) surrounded Sanandaj City.
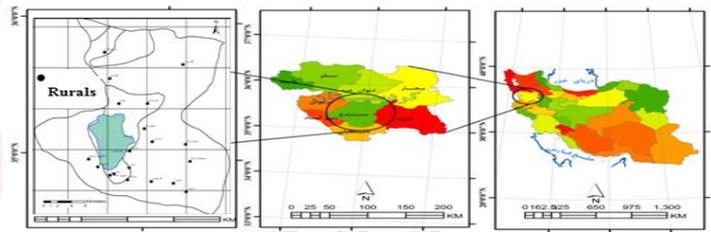

Figure 3: Peripheral areas Sanandaj

IV. PROCEDURE

The type of this research is descriptive-analytical and is based on the process of combining multiple methods. Therefore, in this study to evaluate the space effects of space economy revolution in the peripheral areas of Sanandaj, first of all, necessary criteria of four dimensions of social, economic, physical and infrastructure were identified (Table 1,2).

Accordingly, in the current study in order to operationalize the methodology was designed a questionnaire using the recognized criteria and distributed in the 25 peripheral villages of Sanandaj City in the summer of 2016, among the Village Assistance Bureaus (VAB) , Rural Islamic Council.

The study population consisted of 50 people (employees of Rural Islamic Council and Village Assistance which in general, 96 samples, 2 people from Rural Islamic Council and 2 people from Village Assistance of each village were selected.

Table1 : The Spatial Effects of Space Economy

	Economic Dimension of the Spatial Effects			
E10	Increased employment opportunities in service sector	E1	Increased investment in infrastructure	
E11	Increased employment opportunities in agriculture	E2	Increased investment in buy and sell housing	
E12	Increased revenue from service sector activity than other activities	E3	Increased investment in industry	
E13	Income inequality between residents	E4	Increased investment in productive and entrepreneurial services	
E14	Reduction of employees in agriculture sector	E5	Increased investment in agriculture	
E15	Increased prices of goods and services	E6	Increased investment in the livestock industry (cattle farming & animal husbandry)	
E16	Reduction in the area under cultivation	E7	Buying and selling land for farming and gardening	
E17	Rising land prices	E8	Increased revenue	
E18	Seasonal incomes of rural households	E9	Increased employment opportunities in industrial sector	

Table 2: The Spatial Effects of Space Economy

	Spatial Effects in the Physical and environmental Dimension		Spatial Effects in the Social Dimension
E34	Housing improvement (improvement in home appliances, improve housing quality and …)	E19	Rural population growth
E35	Improving transport facilities	E20	Employment of women and children
E36	Improving infrastructure of services	E21 E22	Increased urban – rural migration and travel
E37	Improving access to communication services (telephones, …)		
E38	Development of roads' infrastructures	E23	Increased participation in the development and renewal
E39	Development of financial services such as Post Bank and Corporations	E24	Improving educational facilities
E40	Expansion of investment in water transfer projects to the farms and gardens	E25	Improving health facilities
Spatial Effects in the Infrastructure Dimension (services and manufacturing)			
E26	Destruction of natural landscapes of villages		
E27	Garden and agricultural land conversion to second home		
E28	Infrastructure development		
E29	Housing reconstruction		
E30	Rehabilitation and development of network of connection paths		
E31	The spread of illegal construction		
E32	Encroaching on rural natural resources		
E33	Rural environment pollution		

In order to identify the most important spatial implications and effects, space economy revolution in the study area, using multi – criteria decision analysis methods FTOPSIS, the

spatial effects in each dimension have been recognized. Details will be presented in the following.

Fuzzy TOPSIS model was first presented by Chen & Hwang to make decision on "n" criterion and "m" option. This model contains several stages to analyze data. The first step is creating decision matrix, which has been shown as in equation (1).

$$\tilde{A} = \begin{bmatrix} \tilde{x}_{11} & \tilde{x}_{12} & \dots & \tilde{x}_{1n} \\ \tilde{x}_{21} & \tilde{x}_{22} & \dots & \tilde{x}_{2n} \\ \dots & \dots & \dots & \dots \\ \tilde{x}_{m1} & \tilde{x}_{m2} & \dots & \tilde{x}_{mn} \end{bmatrix} \quad \text{Equation (1)}$$

In this technique, if triangular fuzzy numbers are used for analyzing data, the performance will be as $\tilde{x}_{ij} (a_{ij}, b_{ij}, c_{ij})$.
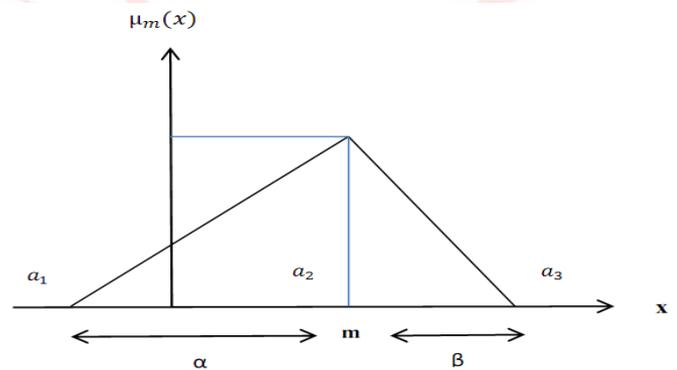

Figure 4: Membership function of fuzzy numbers in fuzzy environment

Meanwhile, in order to classify research indicators in the research technique framework, fuzzy verbal variables have been used in the form of triangular numbers as shown in the table 3:

Table3 : Verbal variables for analyzing importance of research indicators

Fuzzy number	ID	Importance of indicator
(1,1,3)	VP	Very Poor
(1,3,5)	P	Poor
(3,5,7)	M	Medium
(5,7,9)	G	Good
(7,9,9)	VG	Very Good

In the second step, weight matrix of criteria is defined as specified in equation (2).

$$w_{j1} = min_k\{w_{jk1}\} \qquad \text{Equation (2)}$$

$$w_{j2} = \frac{\sum_{k=1}^{k} w_{jk2}}{k}$$

$$w_{j3} = max_k\{c_{jk1}\}$$

The third step is normalization of fuzzy decision matrix in which following equations are used:

$$\tilde{r}_{ij} = \left[\frac{a_{ij}}{c_j^*}, \frac{b_{ij}}{c_j^*}, \frac{c_{ij}}{c_j^*}\right]$$

$$\tilde{r}_{ij} = \left[\frac{a_j^-}{c_{ij}}, \frac{a_j^-}{b_{ij}}, \frac{a_j^-}{c_{ij}}\right] \qquad \text{Equation (3)}$$

In these equations $c_j^* = max_i\ c_{ij}$ and $a_j^- = min_i\ a_{ij}$.
Normalized fuzzy matrix $(\tilde{R})$ would be as follows regarding the above equations:

$$\tilde{R} = \tilde{r}_{ij})_{m \times n} \quad \text{I=1, 2..., m} \qquad \text{Equation (4)}$$

At the next stage, of the studied criteria positive and negative aspects of criteria are calculated. In this model, following equations have been used to calculated values given:

$$\tilde{v}_{ij} = \tilde{r}_{ij}.\tilde{w}_{ij} = \left\{\frac{a_{ij}}{c_j^*}, \frac{b_{ij}}{c_j^*}, \frac{c_{ij}}{c_j^*}\right\}.($$

$$w_{j1}, w_{j2}, w_{j3}) = \left\{\frac{a_{ij}}{c_j^*}.w_{i1} \frac{b_{ij}}{c_j^*}.w_{i2} \frac{c_{ij}}{c_j^*}.w_{i3}\right\}$$

$$\tilde{v}_{ij} = \tilde{r}_{ij}.\tilde{w}_{ij} = \left\{\frac{a_j^-}{c_{ij}}, \frac{a_j^-}{b_{ij}}, \frac{a_j^-}{a_{ij}}\right\}.($$

$$w_{j1}, w_{j2}, w_{j3}) = \left\{\frac{a_j^-}{c_{ij}}.w_{i1} \frac{a_j^-}{b_j^*}.w_{i2} \frac{a_j^-}{a_{ij}}.w_{i3}\right\}$$

Equation (5)

The fifth step in this model is to calculate Fuzzy Positive Ideal Solution (FPIS) and Fuzzy Negative Ideal Solution (FNIS). These states are calculated using following equations:

$$A^+ = [\tilde{v}_1^*, \tilde{v}_2^*, ... \tilde{v}_n^*]$$

$$A^- = [\tilde{v}_1^-, \tilde{v}_2^-, ... \tilde{v}_n^-] \qquad \text{Equation (6)}$$

In these equations, $\tilde{v}_i^*$ is the best amount of criteria and $\tilde{v}_i^-$ is the worst amount of criteria.

The next step contains calculation of distance of positive and negative ideal which are calculated respectively using the following equations:

$$S_i^* = \sum_{j=1}^{n} d = (\tilde{v}_{ij}, v_j^*)$$

$$S_i^- = \sum_{j=1}^{n} d = (\tilde{v}_{ij}, v_j^-) \qquad \text{Equation (7)}$$

The last step in this model is calculation of the similarity index which is obtained through following equation:

$$cc_i = \frac{S_i^-}{S_i^* + S_i^-} \qquad \text{Equation (8)}$$

V. FINDING

Based on the used indices and items for measuring each dimension of spatial effects on space economy revolution in peri – urban of Sanandaj City, the raw data matrix of each criterion in the studied rural areas were collected through questionnaires and then the scores given for questionnaires of each village were replaced by membership function of fuzzy numbers, and then the total fuzzy scores were calculated for each index in each village. This was also done for other criteria in other villages, which results in fuzzy decision making matrix, assessment of spatial effects of Space Economy Revolution in social, economic, physical – environmental and infrastructure dimension. After converting weights evaluated by experts into fuzzy triangular numbers, normalization and weighted standard matrix were calculated for the all criteria and variables according to table 4 & 5 and chart 1-5. Result this analysis will be presented in the following:

Table 4 : Calculation of positive ideal solution and negative ideal solution, similarity index, and ultimate ranks of the research indicators

| Spatial Effects in Economic Dimension									
Indicator	D⁻	D⁺	A*	Ranking	indicator	D⁻	D⁺	A*	Ranking
E10	4.109	4.526	0.524	3	E1	6.688	1.526	0.186	5
E11	7.454	0.873	0.105	6	E2	3.305	5.34	0.618	2
E12	4.109	4.526	0.524	3	E3	7.454	0.873	0.105	6
E13	4.109	4.526	0.524	3	E4	6.688	1.526	0.186	5
E14	3.305	5.34	0.618	2	E5	6.688	1.526	0.186	5
E15	4.109	4.526	0.524	3	E6	6.688	1.526	0.186	5
E16	3.305	5.34	0.618	2	E7	2.775	6.173	0.69	1
E17	2.775	6.173	0.69	1	E8	7.454	0.873	0.105	6
E18	4.91	3.422	0.411	4	E9	7.454	0.873	0.105	6
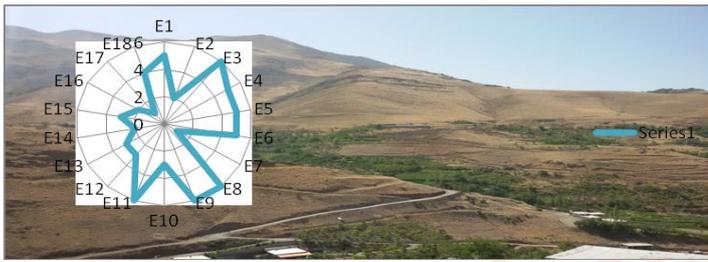
Chart 1: Economic Dimension of the Spatial Effects Ahmadi, 2017

Table 5: Calculation of positive ideal solution and negative ideal solution, similarity index, and ultimate ranks of the research indicators

Spatial Effects in the Physical and environmental Dimension				Spatial Effects in the Social Dimension				
indicator	D⁻	D+	A*	Ranking	indicator	D⁻	D⁺	A*	Ranking
E34	2.790161	5.860461	0.677	2	E19	0.894	6.633	0.881	1
E35	1.987461	6.863672	0.775	1	E20	6.425	0.980	0.132	5
E36	3.958851	4.767337	0.546	3	E21	1.537	5.829	0.791	2
E37	3.958851	4.767337	0.546	3	E22	6.425	0.980	0.132	5
E38	5.034878	3.474191	0.408	5	E23	1.697	5.628	0.768	3
E39	1.987461	6.863672	0.775	1	E24	1.697	5.628	0.768	3
E40	3.958851	4.767337	0.546	3	E25	4.168	3.210	0.435	4

Spatial Effects in the Infrastructure Dimension (services and manufacturing)				
indicator	D⁻	D⁺	A*	Ranking
E26	3.81084	3.47455	0.477	2
E27	2.184605	5.442656	0.714	1
E28	2.184605	5.442656	0.714	1
E29	3.81084	3.47455	0.477	2
E30	2.184605	5.442656	0.714	1
E31	6.458522	0.873212	0.119	3
E32	3.81084	3.47455	0.477	2
E33	2.184605	5.442656	0.714	1
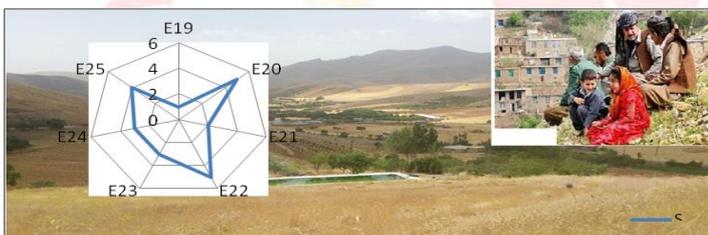
Chart 2: Spatial Effects in the Social Dimension
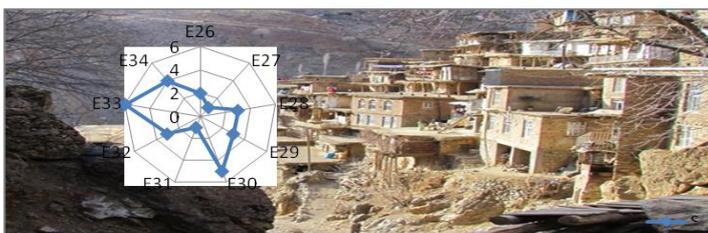
Chart 3: Spatial Effects in the Physical and environmental Dimension

Chart 4: Spatial Effects in the Infrastructure Dimension

VI. Conclusion

Space and its revolution is actually an objectivity resulting from mutual interactions of individuals and human groups in a place, or in other words, it is the consequence of interactive functions of two natural – ecological and socio – economic environments. Special structure of any place represents interaction between human society and surrounding natural environment (Coates, et al, p: 253). The study and understanding of space systems requires considering the location of functions and interaction between them (Jahnston, p, 5).

In general, internal and external factors and forces are gradually affecting rural settlements of peripheral villages, so that these changes has been manifested markedly in the social, economic, physical, and spatial structures of these settlements (Saedi and Yamani, 2014: 9). These forces include a set of contributing factors and forces in local, regional and global scale (Saduq and Saedi, 2006).

Therefore, in this study in order to evaluate the spatial effects of Space Economy Revolution, after conducting interviews with experts and academic elite, and designing a researcher – made questionnaire, the spatial effects of Space Economy Revolution were identified in peripheral of Sanandaj City.

The results show (Table 4 & 5, Chart 1-4), that of the most important effects of Space Economy Revolution in the economic sector include rising land prices, buying and selling land for farming and gardening, reduction in the area under cultivation, increased investment in real estate sector (buy and sell housing). The most important social effects of Space Economy Revolution are rural population growth, increasing rural – urban migration.

The most important physical – environmental effects of Space Economy Revolution in the peripheral villages of Sanandaj include garden and agricultural land conversion to second home, destruction of natural landscapes of villages, and the spread of illegal construction.

And in the infrastructure facilities and services, the effects of Space Economy Revolution in the peripheral villages of

Sanandaj include improving infrastructure of services, improving access to communication services (telephones, ICT databases, …), Development of financial services such as Post Bank and Corporations.

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