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REGIONAL SETTLEMENT SYSTEM AS A BASIS FOR THE FORMATION OF GROWTH POLES (CASE OF KHARKIV REGION)

The article deals with analysis of population resettlement systems of the Kharkiv region in order to allocate the regional growth poles. The analysis of scientific researches in the field of "center-periphery" theories, the theory of "central places" and the study of the supporting framework of resettlement have been carried out. The works by J. Thünen, W. Christaller, A. Lösch, F. Perroux, W. Isard, G. Lappo and other authors have been analyzed. Some aspects of the urban study woldwide are presented. The spatial formational aspects of the modern urban settlement system of Kharkiv region are revealed. There are two stages of formation of the regional growth poles. stage I – 16-17 centuries, formation of the supporting framework of population settlement in connection with settlement development of the regional territory; stage II – 19-20 centuries, active economic, industrial development of Kharkiv region. In accordance with the theory of integral systems of resettlement, the diversified organizational cores of the settlement system by population of the Kharkiv region have been determined. The organizational core of the rank 1 is Kharkiv (the central city in the region), 2 rank`s cities are Lozova and Izium (major cities of oblast significance), 3 rank`s cities are Kupiansk, Balakliia, Liubotyn, Pervomaiskyi, (cities with the predominance of industrial and transport functions), 4 rank`s cities are Bohodukhiv, Vovchansk, Zmiiv, Barvinkovo, Nova Vodolaga, Vysokyi, Dergachi (regional agro-industrial centers), 5 rank`s cities are Panyutyne, Kozacha Lopan, Borova (cities and villages that have an important transport position), 6 rank`s cities are Blyzniuky, Vilcha, Chervonyi Oskil, Kolomak, Zachepilovka (villages with high development of agriculture). Problems and perspectives of evolution of the Kharkiv region resettlement system are revealed.

Keywords: supporting frame of population settlement, growth poles, center-periphery, settlement system, evolution of the settlement system, population core, urban settlement.

Костянтин Нємець, Катерина Кравченко, Анастасія Мазурова, Катерина Сегіда, Анатолій Лур'є. СИСТЕМА РОЗСЕЛЕННЯ РЕГІОНУ ЯК ОСНОВА ФОРМУВАННЯ ПОЛЮСІВ РОСТУ (НА ПРИКЛАДІ ХАРКІВСЬКОЇ ОБЛАСТІ)
У статті розглянуто систему розселення регіону у якості основи формування полюсів росту на прикладі Харківської області. Проведено аналіз наукового доробку у сфері «центр-периферійних» теорій, теорії «центральних місць» та вивчення опорного каркасу розселення. Наведено ретроспективний аналіз дослідження в світовій науці міст та міського простору. Розкрито просторово-часові аспекти формування сучасної системи міського розселення Харківської області. За теорією інтегральних систем розселення виявлено різнорангові організаційні ядра системи розселення населення Харківської області. Визначено проблеми та перспективи еволюції системи розселення Харківської області.

Ключові слова: опорний каркас розселення населення, «полюси росту», «центр-периферія», система розселення, еволюція системи розселення, ядра розселення, міське розселення.

Константин Немец, Катерина Кравченко, Анастасия Мазурова, Катерина Сегида, Анатолий Лурье. СИСТЕМА РАССЕЛЕНИЯ РЕГИОНА КАК ОСНОВА ФОРМИРОВАНИЯ ПОЛЮСОВ РОСТА (НА ПРИМЕРЕ ХАРЬКОВСКОЙ ОБЛАСТИ)
В статье рассмотрена система расселения региона в качестве основы формирования полюсов роста на примере Харьковской области. Проведен анализ научных наработок в области «центр-периферийных» теорий, теории «центральных мест» и изучение опорного каркаса расселения. Представлен ретроспективный анализ исследования городов и городского пространства в мировой науке. Раскрыто пространственно-временные аспекты формирования современной системы городского расселения Харьковской области. В соответствии с теорией интегральных систем расселения определены разноранговые организационные ядра системы расселения населения Харьковской области. Выявлены проблемы и перспективы эволюции системы расселения Харьковской области.

Ключевые слова: опорный каркас расселения населения, «полюса роста», «центр-периферия», система расселения, эволюция системы расселения, ядра расселения, городское расселение.

Formulation of the problem. Ukrainian regions are experiencing times of deep socio-economic, political and institutional transformations. Modern decentralization of particular importance and require study of these and many other issues, including the definition of regional growth poles. In modern times due to the decentralization policy and attempts to improve the socio-economic development of Ukraine raises the question in determining the growth poles by the state and regions.

For Kharkiv region as one of the most progressive scientific, cultural and economic center of the state, there is a question in determination of the main regional growth poles and the reasons of their origin.

The purpose of the study is analysis of resettlement systems of the population of the Kharkiv region in order to allocate the regional growth poles.

Research of Kharkiv regional resettlement system was conducted on the basis of "center-peripheral" and "growth poles" theories. The first theoretical and methodological researches of framework of settlement pattern belong to the French researcher L. Lullan [27] and to the representatives of the German scientific school: J. Thünen [13], W. Christaller [20], A. Lösch [5]. The authors of the practical theories are F. Perroux [28], W. Isard [25, 26], G. Lappo [4]. Let us note that historically the theory of poles (centers) of growth has gained its development in the economy and has continued to spread to other sciences. Among the founders of the theories of cumulative growth are well-known scientists: J. Friedman [21, 22], I. Wallerstein [30], T. Hagerctrandt [23], J. Boudeville [18]. They developed a number of models of socio-economic development of the regions. In particular, these are the models of growth poles (F. Perroux, J. Boudeville) [18, 28], the growth of urban agglomerations (H. Richardson), the theory of "center-periphery" (J. Friedman) [21, 22], the model of "volcano" (H. Hirsch), model "Wave-innovations" (T. Hagerctrandt) and others. The validity and effectiveness of these models has been confirmed in the practice of regional development in many countries of the world.

In the work of L. Lalanne for the first time with the help of the graph-analytical method, the relationship between the hierarchical structure of cities and the development of transport networks was established, that is, an attempt was made to analyze the structural features of the regional resettlement system [27].

W. Christaller proposed a model of spatial location of settlements around the largest settlement (central), which in future development was called "the theory of central places". W. Christaller during the solution of the issue of improving the administrative-territorial structure of the state through the definition of regularities in urban settlements, it was discovered that settlements are developing similarly to the objects of the natural environment according to the law of mass crystallization around nuclei and represent a framework (hexagonal lattice structure) [20].

Christaller`s study of urban settlement system is presented in a reference frame moving, allowing the system to consider settlement as an established structure and the regularities of settlement systems, allowing them to speak to establish such system characteristics as dynamic, hierarchical self-organization and emergence. Christaller`s model has some disadvantages because it does not take into account the deforming influence of such factors as transport and other communication channels, which will guarantee complicate the developed concept. Ideas of W. Christaller about a hexagonal lattice structure was implemented by A. Lösch, who provided the model of territorial self-organization of society and economic activity – economic landscape is heterogeneous in nature, which further revealed the particular situation of cities as the proportion of urban population grows [5, 13, 20].

F. Perroux developed and formalized the economic theory of growth poles (growth focus), which emphasized inequality as the basic principle of the development of the economy, which in turn affects the development of individual elements of the settlement system. According to F. Perroux, the growth poles can be considered as populated point, from which centrifugal forces emerge and which is the pole of gravity for other settlements. The problematic issue of this theory is the relativity not to real territorial entities, but to the abstract, rather economic than geographic space [28].

On the basis of the theories of W. Crystaller and A. Lösch, W. Isard proposed a concept which allows taking into account the sintering effects in the study of systems: the hexagonal lattice from the correct transforms into incorrect, denser around the sinter center, which is practically proves impossibility of existence of correct hexagonal surfaces on any real territory.

G. Lappo considers cities and settlements in the aspect of urban planning. He offered the concept of urban development and resettlement systems. The key idea of the concept of city development is a combination of functions performed by the city, their scale and territorial orientation. In the concept of resettlement, G. Lappo emphasizes that the uncertainty in the projections of the transformation of resettlement systems causes the development of several trajectories of the resettlement`s development systems simultaneously, ensuring the variability of the system development of various hierarchical levels. G. Lappo emphasizes the interdependence between the territorial differentiation of conditions (natural, historical, cultural, national-demographic and socio-economic) and the resettlement of the population, which in turn can also act as a factor in territorial differentiation and its deepening. If an attempt is made to conditionally disassociate the settlement, it is possible to obtain habitats with an excellent character of resettlement according to such indicators as size of settlements, density of their network, hierarchy, uniformity and unevenness, level of concentration of population and the degree of manifestation of resettlement`s centers of different categories, by which it is possible to find out territorial urbanization structures [4].

The study of the relationship "center-periphery" is presented in J. Friedmann`s works, which establishes the relationship of measures to the level of development of the settlement, depending on its location relative to the settlement`s core. In the "center-periphery" model, he identifies the following economic areas formed by settlement systems: nucleus districts (central regions),

growing areas (peripheral or semi-peripheral districts, located in the proximity of the center and receiving impulses from it), areas of new development and depressed areas (peripheral ones that are almost unrelated to the center and not exposed to it). The nature of the interaction between the center and the periphery determines the direction of information, financial, commodity relations, migration of labor resources. On the basis of the theory of "center-periphery" J. Friedman tried to construct a general theory of regional development, which showed the causality of the uneven development of the territory precisely in the polarization disproportions of development between the nuclei of resettlement by that periphery [21, 22].

Based on the work of J. Friedman, World-system approach was developed by I. Wallerstrain, who considers the development of the history and economy of the world as the interaction of centers and peripheries in differentiated world economies, which determines the redistribution of resources from the periphery to the center, in particular the exploitation of the centers of peripheral territories. According to I. Wallerstein, development is represented by the category of existing or functioning "social systems" in the past, the formation of which is determined by the territorial division of labor [30].

V. Shuper proposed a relativistic theory of central places, which allowed in socio-geographical studies to rely on the relationship between resettlement and space, formalizing research systems of resettlement. According to V. Shuper, any allocation of zones of influence of central places on the basis of two or more functions is conditional [16]. According to P. Toyn in non-strictly fixed central cities, the set of functions in various places is more dynamic [12].

V. Bunge made the assumption that most centers of gravity on the territory are placed in such a way as to minimize overall travel costs, assuming that the centers are located on territories with homogeneous transport conditions. By V. Bunge real distances coincide with geometric distances [1]. In the case of a uniform distribution of population, the centers should be located within the limits of the correct hexagonal lattice. He formulated the hypothesis that the practical application of the Crystaller`s theory is possible only in the case of constant population density.

Evolutionary processes in resettlement systems are disclosed in the works of A. Vazhenin, in particular, the relationship between the evolution of settlement systems and the development of urbanization processes is analyzed, the stability of the systems of central places is determined. In contrast to the classical and relativistic theories of central places that consider static settlement systems, A. Vazhenin described the real dynamics of resettlement systems by applying intermediate hierarchies and linking evolution of settlement systems with urbanization processes [2].

In the works of G. Rydevskyi the center-peripheral processes and their role in the development of urbanization and transformation of settlement systems are considered; study of the change of territorial structures of economy in accordance with the evolution of resettlement systems [9, 10, 29].

Domestic center-peripheral researches are presented in the dissertation researches of I. Pylypenko [7] and E. Marunyak [6]. In the thesis by I. Pylypenko disclosed the socio-geographical basis of the category "center-periphery", the role of the center-peripheral organization in the formation of territorial structures of different levels, developed a scientific-methodological approach to the topological analysis of geospatial at the regional level. E. Marunyak developed a method for evaluating spatial development for various hierarchical levels and developed the concept of an integrated geoplanning process in Ukraine.

Proponents of the theory of polarized development have advanced the benefits of concentration of production, especially "dynamic" industries, in several centers, which, according to their estimates, has a significant economic effect. The concept of growth poles was the basis of the regional programs of many countries. According to most economists, only large industrial enterprises or their aggregate can form the basis for the development of any growth pole. However, the Ukrainian geographer G. Pidgrushny believes that also the enterprises of the tertiary sector of the economy can be the basis for the development of a new growth [8]

The creation of any kind of poles and development centers originally aims at intensifying economic activity in the backward peripheral regions. Polarization at the district level is considered in most cases as a means of territorial deconcentration at the macro level, which can weaken the sharp dominance of certain superregions or supercenters.

T. Hagerctrandt developed the theory of "diffusion of innovations", among the main postulates which states that the territorial diffusion of innovations can be modeled, and has certain distribution laws; is a determining factor in detecting the migration effect for the "center-peripheral" relationship, and its speed depends not on the geometric distance, but on the properties of certain cities [23].

Usually, growth poles are considered as cities, which are stable territorial entities, performing a wide range of functions.

The study of the ontology of cities and urban space was undertaken by Plato, Aristotle, T. More, T. Campanella, O. Spengler, A. Toffler and others. The study of urban ontology was started from the time of ancient Greek philosophers. Philosophical comprehension of nature and the essence of the city was highlighted in the works of Plato and Aristotle. Also, a number of provisions concerning the philosophical understanding of the functioning of the city and the city space were laid down in the works of T. More and T. Campanella [14]. In the utopian work of T. Campanella "The City of the Sun" the author describes the city perfect for the existence of a society, its structure and rule corresponding to it.

Among the latest ideas on urban ontology, one can distinguish the work of E. Amin and N. Thrift "Cities: rethinking the city". In this work, the authors pay considerable attention to the theme of everyday practice in the city, the theory of "collisions", the city as a place of coexistence of global and local, virtual and real [17].

In the works of classic sociologists F. Tennis, G. Simmel, K. Marx, E. Durkheim and M. Weber, the

study of the city took place mainly in the framework of the analysis of the city social structure, the characteristics of the population of different historical periods (for example, society and community by F. Tennis, organic and mechanical solidarity by E. Durkheim) [11].
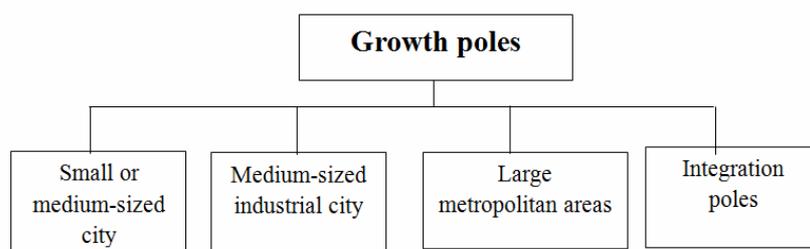
E. Burgess and H. Hoyt made a great contribution to the development of scientific thought regarding the structuring of urban space. In the scientific work "Growth of cities" E. Burgess s first described in detail the idea of concentric zones in Chicago, which, according to R. Park, E. Burgess and D. McKenzie, are located in the following order: zone I – the central business district; zone II – transition zone, where offices and light industry enterprises are located; zone III – working-class living area; zone IV – zone of residences, there are houses for one family; zone V – suburban area of satellite towns located in a 0.5-1 hour drive from the city center [19].

The multi-core model of spatial urban structure was proposed by American geographers C. Harris and E. Ulman. Rapidly developing cities may have several central business districts. Each center specializes in specific activities and has an impact on the surrounding part of the city. Urban core can be formed around specialized centers (transport nodes, shopping centers, campuses, industrial clusters). The model of the set of centers is more suitable for describing the unique characteristics inherent in specific urban structures than for the identification of universal spatial characteristics in all cities [24].

The study of the economic categories of the city and urban space, in particular the issues of the economic efficiency of urban space, the optimal placement of enterprises, the formation of urban land rent were P. Vidal de La Blache, A. Marshall, D. Hicks, P. Krugman, M. Fujita and others. The study of A. Marshall deserves attention, which suggests that the placement of enterprises in the city is beneficial through the formation of a market of highly specialized labor, the development of new ideas, infrastructure etc.

By J. Boudeville growth poles can be classified as small, classical and industrial cities and large metropolitan areas and the integration of the pole, although autonomous development is possible only for the upper hierarchical levels, while lower levels of growth may be due mainly processes of innovation diffusion (fig. 1) [18].

Fig. 1. Classification of cities-growth poles *(made by authors by [18])*

He developed a classification of growth poles, by which the poles are divided into small and medium-sized "classical" cities, specializing in traditional productions and serving the adjacent terrain; medium-sized industrial cities with a diversified structure of the economy that develops through external investment and transfers; large urban agglomerations with a developed and modern structure of the economy, including advanced production, which determines the potential for autonomous growth; poles of integration covering several urban systems and determining the growth of the economy of the entire region and country.

Kharkiv region has powerful economic, scientific innovation, demographic potential, and therefore determine the growth poles in the region has scientific and practical importance. In our view, an important basis for determining growth poles are available demographic and settling potential of the region. Region`s settling system is a closely interconnected urban and rural settlements of various sizes and economic purpose, united developed transport and industrial relations, general production infrastructure, unified network of public centers for social and cultural services and places of recreation [15].

Formation of modern network of Kharkiv region`s city resettlement has begun in the 16th century, and differs in two types of formation of settlements.
- Natural: during settling and agricultural development of the territory (Kharkiv, Izyum, Valky), the 16-17th centuries;
- Artificial: connected with economic development of the territory (Lozova, Pervomaiskyi) or administrative orders of the power (Chuhuev), the 18-19th centuries.

The retrospective analysis of settling development revealed next stages of growth poles in the region (Table 1):
- stage I – 16-17 centuries. Formation reference frame population settlement in connection with the settling development of the territory, forced settlement of the region in the early 17 century that Ukrainians and Russians defended the southern borders of Moscow kingdom;
- stage II – 19-20 centuries. Predefined active economic, industrial development of the region, characterized by labor migration in the Kharkiv region. Most cities of Kharkiv region formed in the first stage, due to settling development. Cities have been arising as artificial and natural way. In the second stage of the formation settling framework was established only four cities. There are Lozova, Pervomaiskyi, Krasnohrad,

Pivdenne. They artificially created thanks to the economic development of the territory.

The system of resettlement of Kharkiv region has historically passed as stages of relatively even develop-

ment, as well as the stages of reorientation of development vectors in the direction of industrial centers, development poles, the largest of which is the administrative center of the region, Kharkiv city.

Table 1

Formation of the Kharkiv region`s growth poles *(made by authors by [3])*

№	City	Year of establishment	Year of getting city status	Type of formation	Stage of formation
1.	Kharkiv	1630	1669	natural	I
2.	Lozova	1869	1939	artificial	II
3.	Izyum	1637	1685	natural	I
4.	Chuhuev	1533	1638	artificial	I
5.	Pervomaiskyi	1869	1991	artificial	II
6.	Kupiansk	1655	1779	natural	I
7.	Balakliia	1663	1938	natural	I
8.	Merefa	1595	1938	artificial	I
9.	Liubotyn	1650	1937	natural	I
10.	Krasnohrad	1731	1797	artificial	II
11.	Vovchansk	1674	1780	artificial	I
12.	Derhachi	1660	1689	natural	I
13.	Bohodukhiv	1661	1681	artificial	I
14.	Zmiiv	1604	1797	natural	I
15.	Barvinkove	1653	1938	natural	I
16.	Valky	1646	1938	natural	I
17.	Pivdenne	1906	1963	artificial	II

In the theory of central places, W. Christaller proved that under the conditions of such an ideal economic space, focus (or core) of different levels of the hierarchy that draw the settlement of the lower levels necessarily arise. Since urban settlements are concentrated by the overwhelming majority of the population

and they are concentrated in a variety of functions, they are the organizational cores of resettlement systems of different hierarchical levels. Their rank by population determines the level of settlement system [14]. Fig. 2 shows the cores of resettlement by population of Kharkiv region.
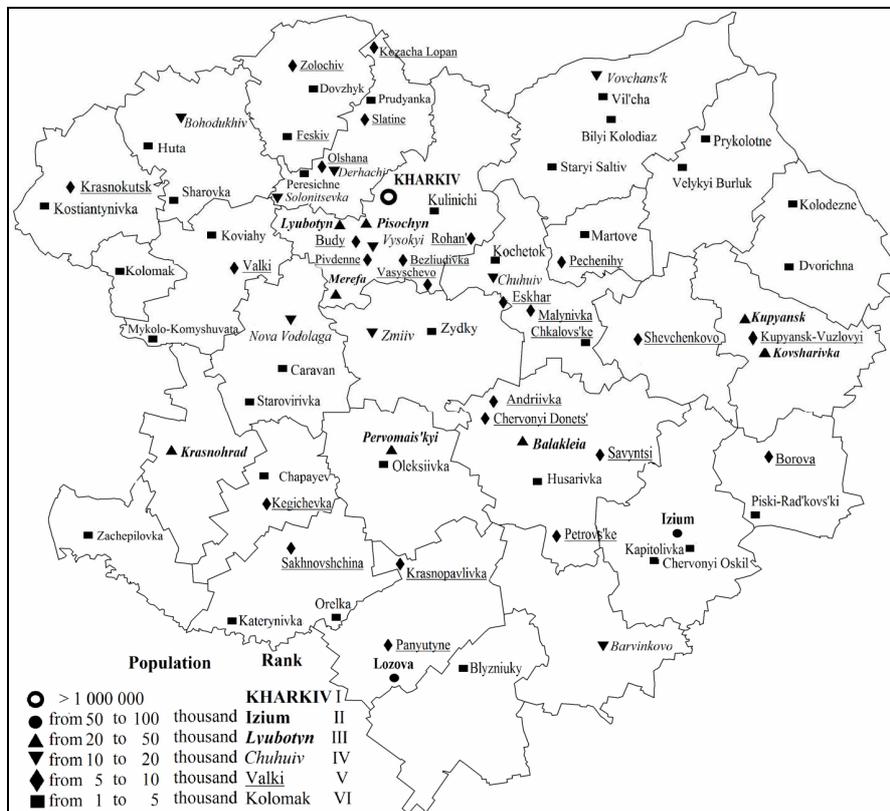

Fig 2. Organizational growth poles settlement system of Kharkiv region, 2016 *(made by authors)*

The analysis of the settlement system of the Kharkiv region reveals a significant slope in the development of the urban settlement system in the region, with the center of gravity in Kharkiv city. Given the political and economic peculiarities of development and administrative significance, Kharkiv city of serves as the organizational center of the settlement system of the Kharkiv region and rank I. Kharkiv city has the largest population in the region.

To the organizational core of the resettlement of the Kharkiv region of the II rank are two cities of regional significance, Lozova and Izium. The population of these cities is two times smaller than population of Kharkiv. A significant population of these cities is associated with their advantageous transport and geographical location (Fig. 3).

The organizational centers of population settlement of the III rank are cities, mainly with industrial and transport functions, Kupiansk, Balakliia, Liubotyn, Pervomaiskyi, cities of regional and district significance.

The core of the settlement of IV rank are the cities that are the agro-industrial centers of the region. There are Bohodukhiv (milk, meat, fruit and vegetable plant), Vovchansk (food industry), Zmiiv (milk and sausage industry), Barvinkovo, Nova Vodolaga, Vysokyi, Dergachi.

Resettlement centers of the V rank are cities and towns of the urban type, which have important transport functions, transport hubs, located in peripheral areas. There are Panyutyne, Kozacha Lopan, Borova and others.

The institutional core of the settlement of the VI rank are the villages with a significant level of agriculture development, such as the Blyzniuky, Vilcha, Chervonyi Oskil, Kolomak, Zachepilovka and others. These are predominantly peripheral development centers.
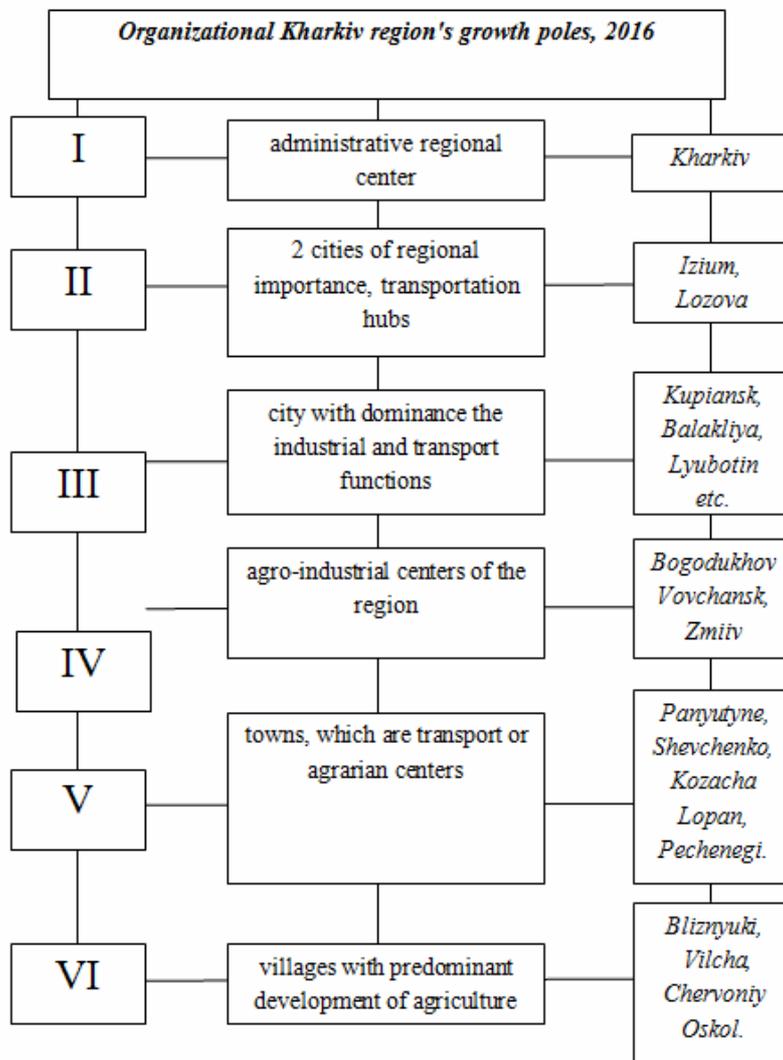

Fig. 3. Organizational Kharkiv region`s growth pole by ranks, 2016 (made by authors)

Conclusions. One of the important issues for further evolution of the settlement of the Kharkiv region is uneven development and its center of gravity shift of population from the geometric center area to the regional center Kharkiv city. So for the Kharkiv region effective will such a regional policy aimed at integrated settling development of all network elements. Innovative infrastructure in the Kharkiv region is concentrated mainly in the regional center, in our opinion, development of innovative infrastructure in the growth poles of the region, shall become key for their rapid social and economic development, will promote investment attraction, increase in competitiveness.

In our opinion, the greatest attention should be paid to the development of innovation infrastructure. It should become a key to the rapid socio-economic development of the growth pillars of the II-VI ranks, will promote investment attractiveness and increase competitiveness. Several districts of the region have a powerful resource potential for the formation of new growth poles in the future or the transition to a higher rank. This requires additional research, including agricultural production, tourist and recreational infrastructure, etc.

Thus, for the Kharkiv region, such regional policy will be effective, aimed at the integrated development of all elements of the distribution network: the complex development of all the elements of the resettlement network; the improvement of the planning structure of the settlement system; the creation of the necessary conditions for the attractiveness of the rural areas of the region; the development of inter-district and regional transport and communication networks; the development of cities, which in the past were industrial centers and their resource potential; the development of social infrastructure in the peripheral areas of the region; the engagement of temporarily unemployed labor resources in the agricultural sector; investing in promising industries, taking into account investment passports of cities and districts; the Improvement of the Level and Quality of Life and Working Conditions in the region; the regulation of migration processes.

The urgency and timeliness of the definition of the growth poles for the Kharkiv region is strategic, it will help to reduce the territorial disproportions in the development of the region.

The necessity and timeliness determination of growth poles for the Kharkiv region is of strategic importance and will help reduce regional disparities in development. In particular, such strategy completely corresponds to policy of the EU on territorial planning. The polycentrism in the EU became fundamental in territorial planning at all levels – from all-European to city.

The essence of the European policy consists not in direct subsidizing of the lagging behind regions and ignoring of the most successful regions, and in estimating, using and mutually to increase various competitive advantages of each of them. All regions have equal opportunities to find the competitive niche in the European and international market. Relevance and timeliness of determination of poles of growth for the Kharkiv region has a strategic importance, will allow to promote reduction of territorial disproportions in development and will promote active development.

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