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**INNOVATIVE DEVELOPMENT OF REGIONS
OF UKRAINE IN THE CONTEXT OF THE CLUSTER
POLICY IMPLEMENTATION**

**INNOWACYJNY ROZWÓJ REGIONÓW UKRAINY
W KONTEKŚCIE REALIZACJI POLITYKI KLASTROWEJ**

Abstract: The presented research identifies scientific schools of cluster development theory. It is substantiated that in the conditions of globalization, the main factor of the structural transformation of the regional economy and further positive structural changes is the innovative susceptibility of the region. This necessitates the rationalization of the regional economy structure based on the active cluster policy and identification of innovation development priorities of the regions, support of the innovative business development as an important component of the structural policy of the region. It is determined that in order to carry out progressive structural changes in the regional economy, it is necessary to conduct an active cluster policy, which increases the investment potential and effectiveness of the interaction of power and business. Based on the potential of the regions of Ukraine regarding their further innovation development, taking into account the cluster approach, which becomes one of the effective instruments for structural transformation of the regional economy, an estimation of the correlation between the volume of the GRP and indicators of innovation development has been conducted. Three groups of regions have been determined for their role in the overall national innovation process. For each of the groups, the respective directions of interregional cluster innovation policy implementation are proposed for achieving the stable development of regional innovation systems.

Keywords: innovation development, regions, clusterization of regions, structural changes

Streszczenie: W prezentowanym badaniu zdefiniowano szkoły naukowe teorii rozwoju klastra. Uzasadniono, że w warunkach globalizacji głównym czynnikiem przyczyniającym się do dostosowania strukturalnego gospodarki regionalnej i dalszych pozytywnych zmian strukturalnych jest regionalna podatność innowacyjna. Warunkowuje to konieczność przeprowadzenia racjonalizacji regionalnej struktury gospodarczej opartej na aktywnej polityce klastrowej i określeniu priorytetów innowacyjnego rozwoju regionalnego, wspieraniu rozwoju innowacyjnego biznesu aktywnego jako ważnego elementu polityki strukturalnej w regionie. Określono, że w celu przeprowadzenia progresywnych zmian strukturalnych w gospodarce regionu konieczne jest prowadzenie aktywnej polityki klastrowej, która zwiększa potencjał inwestycyjny i efektywność interakcji władzy i biznesu. Uwzględniając potencjał regionów Ukrainy do dalszego innowacyjnego rozwoju, biorąc pod uwagę podejście klastrowe, które staje się jednym z najbardziej skutecznych narzędzi restrukturyzacji regionów gospodarczych, przeprowadzono ocenę zależności korelacyjnej między wielkością regionalnego produktu krajowego brutto oraz wskaźnikami rozwoju innowacyjnego. Wydzielono trzy grupy regionów z definicją ich roli w ogólnym krajowym procesie innowacji. Dla każdej grupy proponuje się odpowiednie kierunki wdrażania międzyregionalnej innowacyjnej polityki klastrowej w celu osiągnięcia zrównoważonego rozwoju regionalnych systemów innowacji.

Słowa kluczowe: rozwój innowacyjny, regiony, klasteryzacja regionów, zmiany strukturalne

Introduction

In order to ensure a stable growth of the regional economies and their structural adjustment, the formation of innovative mechanisms of economic integration, capable of ensuring the achievement of multiplicative and synergetic effects, is urgent.

One of the forms of such integration is the creation and development of economic clusters in the area within a separate region. Development of economic clusters leads to a number of systemic socio-economic changes, both in the global and regional dimensions, and attracts the attention of scientists and practitioners to solving the problem of intensification of the economic development of the regions on the basis of self-organization and non-linear management links. The basis of the formation of a regional innovation policy lies in the so-called theory of creation of the favorable environment for innovations. Its key point is to ensure the dynamic efficiency of the regional economic structure on the basis of the introduction of progressive technologies. This means a creation of territorial (regional) clusters as initiators of the innovative processes. Thus, the use of the cluster approach enables regions to create conditions for the utilization of their resource potential, taking into account the economic, historical and socio-cultural trends in the development of their territories.

Foreign experience in the development of clusters (scientific, industrial, innovation, industrial, and territorial), primarily in Western European countries and the USA¹ allows domestic scientists and practitioners to rely on the positive and proven results of finding models and forms of cluster development, trying to adapt them to domestic ones, with the aim of more efficient use of available resources (financial, industrial, innovative, technological, material, human and others) in terms of socio-economic development of the regions of Ukraine. The trend of cluster formation in the development of foreign business has forced domestic authorities and academics to pay more attention to the development of a policy for the cluster management system and economic development of the territory. Their continued use in Ukraine can strengthen national industrial and economic development.

1. Research Methodology

The purpose of the study is to substantiate the possibilities of using the cluster approach as one of the most effective tools for structural transformation of the regional economies and their further innovative development. In the study we proposed a thesis about the need for division of regions into groups, depending on their participation in the national innovation process. This enables to form directions for the implementation of interregional cluster innovation policy in order to achieve a sustainable development of the regions.

For the research purposes we used secondary information, namely, the data from State Statistics Service of Ukraine for 2016, Decree of the Cabinet of Ministers

¹ I. Pylypenko, *Competitiveness of countries and regions in the world economy: theory, experience of little countries of Western and Northern Europe*, Oykumena, Smolensk 2005, p. 496; *Pilot innovative territorial clusters in the Russian Federation*, ed. by L. Gokhberg, A. Schadrin, Higher School of Economics, 2013, p. 108.

of Ukraine in the field of macroeconomic development and reporting data of Ministry of Economic Development and Trade. This was used in the grouping method to divide 25 regions into innovative clusters. In the formation of clusters we took into account the role of regions in the creating of clusters.

We used statistical methods for further clustering of the regions, namely Spearman rank correlation. Based on 6 selected indicators that characterize the innovation potential of the regions of Ukraine (capital investments, internal running costs for research and development, total amount of innovation financing, number of industrial enterprises that introduced innovations, number of industrial enterprises that sold innovative products, number of organizations that conducted research and development) we performed a ranking of indicators of innovation potential of regions and assessment of the correlations among the indicators. Using this method enabled to determine the strength of the link among the factors of innovation development of regions, construct a matrix of correlation dependences and conduct clusterization of regions based on the factor with the most influence on the independent variable.

The methodology used in the research provided the opportunity to form clusters of regions of Ukraine, divided into the following: regions – leaders, regions – “growth points”, regions – “outsiders”, and offer directions for the implementation of interregional cluster innovation policy.

2. Clustering in the E.U. countries

Clusters, which many consider to be engines of economic growth, have become very popular all over the world.

The term “cluster” comes from the English word cluster, which translate as “group”, “congestion”, “concentration”². This term is widely used in physics, statistics and information technology, but only relatively recently it has become widespread in economics.

Theory of cluster development is one of the main directions and schools of the theory of regional economic growth and is related to the section of the new forms of territorial organization of production. This section is usually divided into 3 scientific schools:

1. American (M. Porter, M. Enright, S. Rozenfeld, M. Lorentzen, M. Storper);
2. British (D. Dunning, D. Humphrey, H. Schmitz, K. Freeman);
3. Scandinavian (B.O. Lundwall, B. Jonson, B. Asheim, A. Izakssen, E. Rainart).

However, it may be noted that the cluster concept is mainly used by representatives of American science. Other scholars, despite the fact that they resort to territorial groupings of enterprises of various industries, are still trying to use other terms³.

² J. Staszewska, *Klaster perspektywą dla przedsiębiorców na polskim rynku turystycznym*, Difin, Warszawa 2009, s. 28.

³ I. Pylypenko, *Competitiveness of countries and regions...*, p. 496; Tischenko, *Theory and practice of cluster organization: foreign experience*, 2010, p. 9-15.

Among many ideas and concepts of the theory of enterprise integration, based on a cluster approach, perhaps the most significant are the works of Michael Porter “Competitive Advantages of the Nation”⁴ and “Competition”⁵, in which he details the relationship between cluster partnership and the competitiveness of firms, industries and the national economy.

Modern foreign researchers show that belonging to a cluster is beneficial for the companies, since it facilitates the access to specialized factors of production and labor force, specific knowledge and competencies. In clusters, the intensity of the creation of new firms, the likelihood of their further survival, the share of exporting companies, the economic performance and innovative activity of enterprises are higher.

Today, almost all European Union member states are implementing national or regional cluster programs in line with the decision of Lisbon EU Summit of 2000. Its aim was to introduce the knowledge economy in the EU member states that is capable of providing higher competitiveness, based on innovation clusters, exceeding the US economy and Japan. The importance of the development of clusters for European economy is evidenced by the fact that in July 2006, the “Manifesto of clustering in the countries of the European Union” was approved, and on January 21, 2008 in Stockholm, within the framework of the European Presidential Conference on Innovations and Clusters “European Cluster Memorandum” was introduced.

In the EU, the cluster support program is developing in the framework of regional, science and technology, and industrial policy. The trend in the development of such programs shows that clusters are the one of the main priorities of European regional, scientific and industrial development. Regional cluster initiatives are mainly concentrated in the regions of industrial restructuring, geographically remote regions and regions experiencing a crisis. Industrial cluster policy, above all, supports the leaders of industrial clusters, and in the development of small and medium industrial business - the development of business infrastructure.

National cluster development assistance programs are the part of innovation policy of the EU regions. It allows to combine the process of generating and sharing knowledge, facilitate the process of transfer of knowledge among universities, firms, and innovative structures, which are united into clusters. The main achievements of such policy are the creation of working groups in the areas of “Effective regional innovation systems”, “Transfer of technologies between universities and enterprises”, “Regional clusters and networks as innovation engines”, which allows to cover all elements of the system of cluster functioning and contributes to their comprehensive study; the European Commission’s development of a business plan based on the research of the activities of individual enterprises and industries; creation of the Center of Research and Competence, focused on conducting researches and market

⁴ M. Porter, *Competitive Advantage*, Alpina Business, 2008, p. 715.

⁵ M. Porter, *Competitiveness*, Moscow 2000.

tests in a cluster environment; the formation of European Research Area, which has become a connecting link between the academic world and industry⁶.

The cluster policy depends on the specifics of the economic policy pursued by the government of the country. Experts distinguish two main models, within which a cluster policy can be implemented – liberal and “conductor”. The liberal cluster strategy is typical of those countries that traditionally pursue liberal economic policies (the US, UK, Australia, Canada, etc.). “Conductor” cluster policy is executed by the governments of those countries that are actively involved in the management of the country’s economic life (France, Korea, Singapore, Japan, Sweden, Finland, etc.)⁷.

Clusters got into the focus of state policy only in the 1990’s, if not taking into account such close, but not identical formations, as territorial-production complexes⁸, the pillars of growth. The next wave of the popularity of clusters is primarily associated with the work of Michael Porter⁹. His developed approach contained recommendations for improving competitiveness for a number of countries¹⁰. To date, the most active cluster policy is in the European Union countries (Germany, France, Spain, Austria, Czech Republic)¹¹ and Latin America (Mexico, Brazil, Chile, Colombia). Over the past two decades, a large array of cluster policy research has been accumulated along with the recommendations for its development¹². The main issues of cluster policy are the admissibility of state intervention in the processes of clusterization. In professional societies, it is widely believed that cluster formation is a natural process that government intervention can only harm¹³. In reality¹⁴ only one of more than 700 analyzed clusters can be fully recognized as a result of targeted policy in Taiwanese Xinchu. However, to find a cluster that did not receive state support, in any form it is not a trivial task. Some of them, for example, in the UK creative industry, are constantly dependent on budget funds¹⁵.

Effective cluster policy implies the balanced support for both the state and business. Although there may be miscalculations on the part of the state related to the wrong choice of priorities or objects of support, the inconsistency of regulatory

⁶ I. Bakushevych, *Experience and perspectives of implementation of innovative clusters in development of knowledge economy in the cross-border regions of Ukraine and Poland*, Department of cross-border cooperation of Institute of regional research of National Academy of Sciences of Ukraine.

⁷ T. Forostyna, *Clusterization as an instrument of increasing the competitiveness of the regions*.

⁸ I. Pylypenko, *Principal differences in concepts of industrial clusters and territorial production complexes*, „Bulletin of Moscow University” 2004, p. 3–9.

⁹ M. Porter, MA: *Harvard Business Press*, On Competition, Boston 2008.

¹⁰ M. Porter, C. Ketels, *Competitiveness at the crossroads: directions of Russian economy development*, 2007

¹¹ C. Ketels, G. Lindqvist, Ö. Sölvell, *Strengthening Clusters and Competitiveness in Europe. The Role of Cluster Organisations*, Cluster Observatory, Stockholm 2012.

¹² E. Kutsenko, *Pilot innovative territorial clusters in Russia: model of sustainable development*, 2015, p. 32-55.

¹³ Martin et al., 2008; Duranton 2011.

¹⁴ C. Van der Linde, *The Demography of Clusters – Findings from the Cluster Metastudy, Innovation Clusters and Interregional*.

¹⁵ C. Landry, *The Creative City: A Toolkit for Urban Innovators* (2nd ed.), London 2008.

measures with the nature of existing problems, pressure from interest groups, which does not allow for the efficient development of cluster structures. Many of these failures characterize the policies of entire groups of countries. For example, some regional innovation strategies in the European Union are marked by low interagency cooperation and excessive attention to prestigious projects and areas¹⁶.

Over the past ten years, the demand for projects to identify and assess directions that have the greatest potential for cluster development in a regional context increased. First of all, we are talking about the above-mentioned project under direction of M. Porter in the United States¹⁷ and the activity of European Cluster Observatory¹⁸.

3. Cluster policy in Ukrainian reality

In the context of globalization, the main factor in ensuring the competitiveness of Ukrainian economy and further positive structural changes is the innovative responsiveness and ability to implement an innovative strategy for the development of the regions. In Ukraine, the transition to an innovative model of development is hampered by the following problems: innovative infrastructure exists without a clear strategy, built on management of its implementation and consistent state policy; dominance of the processes of property redistribution, which are natural antipodes of innovation processes; division of labor, goods and services existing in the international market in general complicates the situation in Ukraine and forces it to win its place; attraction of public administration bodies to the sectoral principles of economic management versus the urgent need to introduce functional principles; fighting in eastern Ukraine.

Increasing the effectiveness of managing structural changes in the regions leads to an increase in the requirements for the regional innovation policy and the formation of an innovative microclimate in the region. A prerequisite for this is a formation of an advanced innovation infrastructure, network innovation systems, as well as a clustered approach to the implementation of innovation policy. Although some researchers point out that, despite the undoubted positive impact of clusters on the development of regional economic systems, they are not mandatory for successful activity in industries with strong international competition¹⁹.

In this regard, the problem of implementation of interregional innovation cluster policy becomes the priority in the study of the issue of innovative development management of the region. The first cluster structures in Ukraine were formed with-

¹⁶ J. Sörvik, I. Midtkandal, *Smart Specialisation in the Baltic Sea Region*, Malmö: S3 Platform, DG JRC – IPTS, 2013.

¹⁷ M. Porter, *The economic performance of regions*, 2003, p. 545–546.

¹⁸ C. Ketels, S. Protsiv, *Methodology and Findings Report for a Cluster Mapping of Related Sectors*, Stockholm: Cluster Observatory 2014.

¹⁹ D. Sepik, *Competitiveness of the regions: certain aspects*, M.: Russian-European Center for Economic Policy, 2005, p. 42.

out a proper legal and legislative framework, under the conditions of unsystematic reformation of the economy. The viability of the cluster strategy was confirmed by the Decree of the Cabinet of Ministers of Ukraine № 1174 “On the State Program for Industrial Development for 2003 - 2011”²⁰, which paid sufficient attention to the development of clusters as one of the directions of increasing the competitiveness of the national economy, which is based on the increase of labor productivity and effective use of resource potential of the regions. In spite of total lack of state support, there are currently 20 clusters operating in Ukraine. A cluster-based approach to regional development is actively being implemented in selected regions of the country (Khmelnitsky, Ivano-Frankivsk, Kherson and Rivne regions), which is a new cycle of initiatives of interested agents, which undoubtedly gives impetus to a new round of development of this problem²¹.

Active cluster policy in the regions of Ukraine more effectively implements the following possibilities: creation of an optimal structure of business organization at the regional level; purposeful management of socio-economic development of regions and achievement of the goals of regional industrial policy; use of the multiplier effect from the development of a particular cluster - development of related industries, services; increase of economic activity of depressed territories of the regions; increase of investment potential; creation of an innovative system of the regions; increasing the effectiveness of the interaction of government and business.

For business, cluster policy is the optimal integration into the regional and national economies, increasing the competitiveness through the stability of the conditions within the cluster, overall corporate strategy; equal access to resources, including financial, technological, personnel, etc.; possibility of using price competition due to lower costs for production of goods and services; possibility of a more flexible and faster response to the change in consumer demand due to closer communication with consumers; reducing the “barriers” and risks associated with the organization of a new enterprise. Development of territorial development strategies, taking into account the cluster approach, is one of the fundamental measures to improve the competitiveness of the regions and achieve their intended goals.

Uneven socio-economic development of the regions requires a differentiated approach, which takes into account their actual role in the economy and territorial structure of the economy. The process of creating innovative clusters should take place in accordance with the specifics of regions: levels of regional innovation potential, financial security of regional budgets, innovation activity of enterprises, levels of their industrial development.

In this regard, the implementation of cluster innovation policy at the interregional level by bringing the regions into the groups in terms of their innovation de-

²⁰ <http://zakon.rada.gov.ua/>.

²¹ *Competitiveness of national economy*, ed by B. Kvasniuk, Fenix 2005, p. 582.

velopment in order to diversify the methods and tools for managing the innovation development of each group is particularly important.

The role of the region in the formation of innovative clusters is determined, first of all, by the nature of the innovation development strategy of the region, which, in turn, depends on the qualitative and quantitative composition of innovation and related resources. The regions that formed the clusters will be able to solve a bunch of problems, for example, clusters take on the solution of most social problems of territories; clusters are aimed at improving the infrastructure of the region in which they operate; clusters provide for the creation of new jobs; growth of the welfare of the territories is ensured where the clusters operate²².

Depending on the degree of current level of socio-economic, innovation, technological, and industrial and economic development, either a strategy of the leader, which characterized by the production and introduction of fundamentally new products, or a strategy of follower, that is, the use of ready-made technologies is chosen.

Based on the potential of the regions of Ukraine to create innovative products, three groups of the regions have been identified, taking into account their role in creating clusters and the main measures for their development have been defined.

To form innovative clusters, as well as any territorial-industrial innovation system, certain resources are needed, among which are innovative, financial, information and production resources. Regions that possess such resources should become the main participants, “locomotives” of innovation clusters. All elements of the innovation infrastructure should be concentrated on their territories:

- innovative (technology parks, innovation technology centers, business incubators);
- information (information and technology centers);
- financial (venture funds, investment centers, insurance companies).

A typical feature of the regions – “leaders” should be a high level of investment attractiveness, which reflects the assessment of the investment climate of the region in relation to the ratio of risk - potential, which is a prerequisite for attraction of the investment in the innovation area of the regional economy. In order to play the leading role in the formation of innovative clusters, the regions of the first group should have a high level of innovation development, which is reflected in the volume of expenses for technological innovation, in the quantity of regionally produced innovative products, as well as in the degree of innovation of the regional management apparatus.

The second group includes the actively developing regions, “growth points”, which have a sufficiently high level of innovation potential and a favorable investment climate.

²² L. Petkova, *Municipal investments and loans*, 2006, p. 158.

The third group of regions, regions - “outsiders”, should use the results of the innovative activity of the first and second groups for the development of their own economy. Innovative development of these regions within the framework of inter-regional cluster policy should be implemented through the artificial introduction of innovations, created by the economically developed regions, into the production area of their territorially localized systems.

On the basis of the data on innovation development of the regions of Ukraine, an estimate of the correlation dependence between the indicators with the use of Spearman rank correlation coefficient was calculated. For the analysis, we selected six indicators that characterize the innovative potential of the regions: capital investments, internal current costs for research and development, total funding for the innovation activity, number of industrial enterprises that introduced innovations, number of industrial enterprises that sold innovative products, organizations that carried out research and development (Table 1) for 2016²³.

The practical calculation of Spearman rank correlation coefficient includes the following steps:

- 1) assigning each of the attributes a serial number (rank) based on the increase (or decrease);
- 2) determining the difference of ranks of each pair of attributes compared;
- 3) squaring each of the differences and summing up the results obtained;
- 4) determining the coefficient of correlation of ranks using the formula

$$r = 1 - \frac{6 \sum d^2}{n(n^2-1)}, \quad (1)$$

where $\sum d^2$ – sum of squared differences of ranks;
 n – number of pair observations.

²³ <http://www.ukrstat.gov.ua/>.

Table 1. Ranking of the indicators of innovation potential of the regions of Ukraine
 Tabela 1. Ranking wskaźników potencjału innowacyjnego regionów Ukrainy

Regions of Ukraine	Volume of GRP per capita (thousand UAH)		Capital investments per capita (UAH/person)		Domestic current expenses for research and development (thousand UAH)		Total volume of financing innovation activity, thousand UAH		Number of industrial enterprises implementing innovations		Number of industrial enterprises selling innovative products		Number of organizations conducting research and development	
	Y	Rank	X ₁	Rank	X ₂	Rank	X ₃	Rank	X ₄	PaRR	X ₅	PaRR	X ₆	PaRR
Vinnitsky	46615	20	5224,0	24	38875,1	9	723188,9	22	22	11	155	16	20	15
Volynsky	34310	22	6144,0	19	13604,1	6	147411,3	25	11	26	108	24	10	17
Dnipropetrovsky	75396	2	10239,5	5	1809644,6	1	14264728,8	7	61	5	441	3	58	3
Donetsky	32318	3	2806,0	9	17695,0	4	610934,6	1	22	3	188	4	15	5
Zhytomyrsky	38520	23	4477,5	23	21314,5	24	143876,8	24	24	27	165	22	9	20
Zakarpatsky	25727	26	3712,2	25	46384,3	25	59666,1	16	10	23	134	23	9	16
Zaporizky	59729	7	6323,7	15	681612,6	12	485798,5	4	45	7	213	5	30	10
Ivano-Frankivsky	37220	18	5765,8	16	20323,1	5	80467,5	10	19	12	128	17	17	15
Kyivsky	74216	5	19340,1	2	264118,8	14	598892,6	14	44	15	289	9	28	11
Kirovogradsky	47469	16	6599,2	12	68847,0	21	262320,4	17	14	22	95	21	15	18
Lugansky	14251	9	1877,4	21	23051,7	17	43456,3	2	6	6	68	13	14	7
Lvivsky	45319	14	7395,5	13	260209,9	10	429278,9	11	58	8	311	6	73	4
Mykolajivsky	50091	10	8435,7	7	380053,0	8	631852,9	13	18	13	91	7	25	8
Odesky	50159	8	7036,7	4	231945,4	11	253712,6	21	36	4	191	8	47	6
Poltavsky	81145	4	10712,0	3	53917,5	15	213315,8	3	23	16	179	15	21	15
Rivnensky	33958	24	3723,7	18	9287,1	26	40421,2	23	16	17	135	25	11	18
Sumsky	41741	15	5207,0	22	126841,5	19	340009,1	9	21	14	118	12	16	15
Ternopilsky	29247	25	4615,0	27	14052,4	22	85871,9	12	23	20	92	26	13	17
Kharkivsky	57150	6	6141,1	8	1993059,0	7	1146467,3	5	93	2	361	2	160	2
Khersonsky	36585	19	4341,3	20	47150,0	18	75023,2	18	16	18	96	18	20	14
Khmelnytsky	37881	21	7090,6	14	12525,9	2	47994,7	26	17	24	141	27	8	21
Cherkasky	48025	13	5268,7	17	112026,6	20	44863,5	8	23	9	149	14	20	12
Chernivetsky	23365	27	2945,9	10	60836,8	23	19034,5	19	11	21	54	20	19	13
Chernihivsky	41726	17	5160,3	26	41000,7	13	65361,5	15	15	25	105	19	15	15
Kyiv	191736	1	36974,2	1	4606286,1	3	2415509,2	6	87	1	409	1	299	1

Source: own research based on: <http://www.ukrstat.gov.ua/>.

Obtained results of correlations between factors of innovative development of the regions is presented in the matrix of correlation dependence (table 2).

Table 2. Matrix of correlation dependence of factors of innovative development of the regions of Ukraine

Tabela 2. Matryca zależności korelacyjnej wskaźników rozwoju innowacyjnego regionów Ukrainy

	Y	X1	X2	X3	X4	X ₅	X ₆
Y	1						
X1	0,95	1					
X2	0,88	0,81	1				
X3	0,31	0,23	0,44	1			
X4	0,70	0,62	0,82	0,42	1		
X5	0,69	0,63	0,76	0,64	0,92	1	
X6	0,85	0,80	0,96	0,23	0,84	0,72	1

Source: own research.

According to the obtained data, clusterization of the regions based on the attribute X1 (capital investments per capita), which, based on the calculations, is significantly affecting the volume of GRP (0,95), volume of domestic current expenses for research and development (0,81) and number of organizations, conducting the scientific research and development (0,80), is presented in Table 3.

Table 3. Clusterization based on X1 (capital investments per capita)

Tabela 3. Klasteryzacja na podstawie X1 (inwestycje kapitałowe na osobę) mln UAH

Regions of Ukraine	Rank	Indicator	Group
Kyiv	1	36974,2	Regions - leaders
Kyivsky	2	19340,1	
Poltavsky	3	10712	
Dnipropetrovsky	4	10239,5	
Mykolaivsky	5	8435,7	Regions - «growth points»
Lvivsky	6	7395,5	
Khmelnysky	7	7090,6	
Odesky	8	7036,7	
Kirovogradsky	9	6599,2	
Zaporizhsky	10	6323,7	
Volynsky	11	6144	
Kharkivsky	12	6141,1	
Ivano-Frankivsky	13	5765,8	
Cherkasky	14	5268,7	
Vinnysky	15	5224	
Sumsy	16	5207	
Chernihivsky	17	5160,3	

Ternopilsky	18	4615	Regions – «outsiders»
Zhytomyrsky	19	4477,5	
Khersonsky	20	4341,3	
Rivnensky	21	3723,7	
Zakarpatsky	22	3712,2	
Chernivetsky	23	2945,9	
Donetsky	24	2806	
Lugansky	25	1877,4	

Source: own research.

The undisputed leader in the innovation area is the city of Kyiv (capital investment per capita is UAH 36,974.2 million). The leaders include Kyivsky, Poltavsky, and Dnipropetrovsky regions. Most of the regions are classified as “growth points”, and “outsiders” of the regions include Ternopilsky, Zhytomyrsky, Khersonsky, Rivnensky and other regions (table 3).

Having analyzed the opinions of Ukrainian scholars on promising directions of clusterization within the framework of functioning economic complexes of meso-economic regions of Ukraine²⁴ and conducted ranking of the indicators of innovative potential of Ukrainian regions and their clusterization, the authors came to the conclusion that for the regions - leaders of Group I (city of Kyiv, Kyivsky, Poltavsky, Dnipropetrovsky) taking into account the potential of their development, it is reasonable to develop agro-touristic clusters and clusters of environmentally friendly products. For the second group of the regions - “points of growth” (Mykolaiivsky, Lvivsky, Khmelnytsky, Odesky, Kirovogradsky, Zaporozhsky, Volynsky, Kharkivsky, Ivano-Frankivsky, Cherkasky, Vinnitsky, and Sumsky), the potential of their development makes it possible to create a construction cluster, transport and logistic cluster, food cluster, IT and business services cluster, cluster for alternative energy, woodworking cluster. For the third group of regions (Ternopilsky, Zhytomyrsky, Khersonsky, Rivnensky, Zakarpatsky, Chernivetsky, Donetsky, Lugansky), taking into account the pace of their economic development, it makes sense to develop a cluster of souvenir production, forest and tourist-recreational clusters, woodworking cluster, transport and logistic cluster (such as the apple cluster “Bukovina”).

Even in today’s challenging conditions, Ukraine is proud to have examples of successful clusters. For example, Lviv IT Cluster, which has been operating for six years now. During this time, the new training programs were launched, homes for IT specialists where being built and the promotion of the city internationally took up. Following the example of Lviv, five other Ukrainian cities - Kharkiv, Dnipro, Odessa, Cherkasy and Ivano-Frankivsk — have launched IT Clusters.

²⁴ http://www.confcontact.com/2013-sotsialno-ekonomicheskie-reformi/2_dmitrenko.htm.

Despite the growing interest of the regions in the new model of the economy, growth of the clusters in Ukraine is insignificant. This is due to, first of all, the lack of system legislation to create cluster support institutions. Secondly, the authorities should adopt the concept of cluster policy at the local, regional and national levels.

Therefore, in the future it is necessary to solve these disadvantages, as well as to support the functioning and development of existing clusters and promote the creation of the new ones.

Conclusion

Creation of the clusters is one of the conditions that enables the effective development of the regions, their economic growth, and strengthening of the regional competitiveness. In modern Ukraine, there are no effective channels of the interaction between the public and private sectors, therefore, the state infrastructure can not be used to the fullest extent to facilitate business development and formation of the effective clusters. The country should use the best world models of building clusters while taking into account the national specifics. It is necessary to improve the mechanisms of the state financial support for innovative formations, develop incentives for their effective integration and increase their competitiveness. Management of the innovation processes in the regions within the framework of the interregional cluster development strategy will enable the authorities to conduct an interconnected set of long-term measures of state-supported development and form the effective clusters in order to increase the competitiveness of the region.

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