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EFFECTIVE INNOVATION POLICY AS A FACTOR SUSTAINABLE REGIONAL DEVELOPMENT

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The aim of paper is devoted to the analysis of the impact of innovation policy on effective regional development in Ukraine. The main goal is the definition of the causes of regional disparities', and estimation of the role of innovation policy for regional development. The adoption and application of innovation policy measures provides the basis for inequalities smoothing and competitiveness increase in Ukraine's regions.

Keywords: *innovations, development, input factors of production, innovation policy.*

Introduction. The aim of paper is devoted to the analysis of the impact of innovation policy on effective regional development in Ukraine. The main goal is the definition of the causes of regional disparities', and estimation of the role of innovative policy for regional inequalities smoothing. The emergence of a global knowledge economy requires a radical transformation of innovation strategy in East European countries. Innovation considers as a basic driving force in the process of narrowing gaps with developing countries in global economy. Innovation defines as important precondition towards a transition into self-sustaining innovation led- growth economy. Effective innovation system includes firms, research centers, R&D institutions that provides new knowledge creation, new goods, processes development.

The concepts of technological accumulation and creative destruction are the core of J. Schumpeterian theory. The author emphasizes the distinctness of R&D from other investments in physical or human capital. The Schumpeter's approach provides a detailed account of the economic and institutional determinants of long-run growth and to conceive of the possibility that growth can be sustainable in an economy with limited natural input resources.

The Ukraine's regional economic performance assessment includes the estimation of the significant factors influencing the existence of disproportions between the sectors. The basic problems of regional development relate to the lack of capital investments, old capital assets, and high share of unprofitable enterprises, enterprise's indebtedness, low level of innovations, and insufficient infrastructure level in Ukraine.

The assessment of Ukrainian competitiveness shows the markets concentration at national level and inadequate finance and human capital distribution in regions. The competition is still weaker at regional level. Concentration has a negative and highly significant effect on labor productivity growth. The financial shortage causes the reduction of the quantity of enterprises applied the innovations. Ukraine scored 56.99 points out of 100 on the 2018 Global Competitiveness Report published by the World Economic Forum, which confirm the low efficiency and labour productivity. Ukraine is ranked 71 among 190 economies in the ease of doing business, according to the latest World Bank annual ratings. The rank of Ukraine improved to 71 in 2018 from 76 in 2017. Ease of Doing Business in Ukraine averaged 112.36 from 2008 until 2018, reaching an all-time high of 152 in 2011 and a record low of 71 in 2018 [1].

The authors used general scientific and special methods of cognition: structural-logical method – to build the general structure of the research; content analysis and bibliographic search – to study of innovative policy in regions; hierarchical cluster analysis – to compare the regions of Ukraine in terms of innovative development; economic and statistical method – to assess the level of innovative development in Ukraine's regions; graphic method – to visualize the results of the study; scientific generalization – to justify the conclusions.

Results of the research. 1. Economic performance in Ukrainian regions in transition. The late and incomplete reforms impede the economic development in Ukraine. It creates numerous market distortions and arbitrage opportunities that generated highly concentrated rents for powerful special interest groups. The modern spatial development of Ukraine characterizes by such main transformational tendencies as:

- strengthening interregional socio-economic differentiation;
- combination processes of interstate interregional integration and disintegration;
- transition from economic downturn to economic growth with significant regional peculiarities.

Disproportionate development of the regions negatively affects the development of the country. It should be noted an increase in disproportions between regions in many indicators, both economic and social in Ukraine's regions in transition [2].

The consequences of crisis of 2008-2009 significantly affect the economic development in Ukraine. Global growth dropped to almost 3 percent in 2012, which indicates that about a half a percentage points shaved off the long-term trend since the crisis emerged [3]. The global financial crisis drop in GDP is about 4 percent and at least Latvia and Ukraine are likely to face double - digit decline [4]. The fixed exchange rate evokes the speculative motives for short-term lending from European banks, and results in increase the balance of payments deficits in East Europe. The slowing global trend stipulates the rise of inequalities and imbalances within Ukraine. The number of depressed regions increases, and as a result regional disparity are accumulated. GDP showed a positive dynamic starting from 2000 until 2009 when the GDP dropped by 15.1 percent which was a direct consequence of the world financial crisis (Figure 1). Inflation in Ukraine remains relatively high (10-20 percent increase annually with the lowest level in 2002 (0.7 percent) and the highest ones in 2000 (28.2 percent) and 2008 (25.2 percent). The value of the current account balance had a surplus during 1999-2005 period with the highest value in 2004 (6.9 billion US dollars) and a deficit during 2006-2009 with the lowest value in 2008 (12.8 billion US dollars).

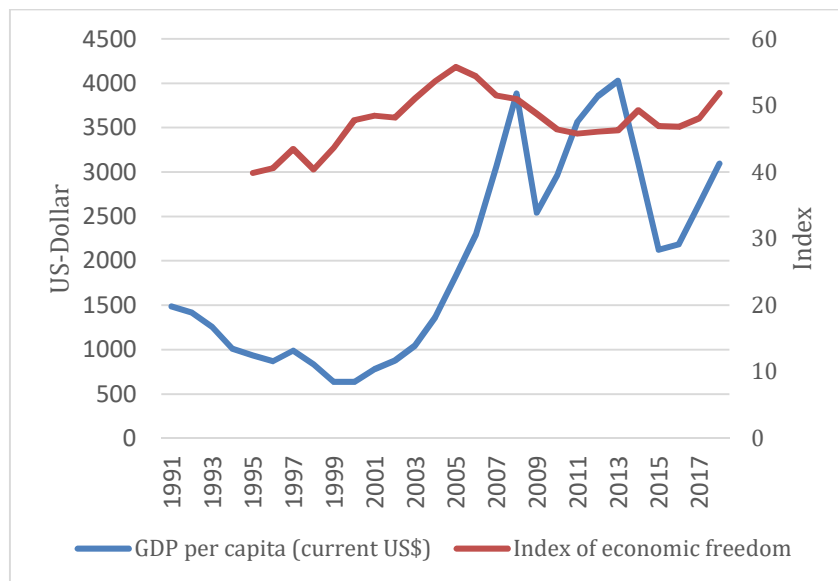


Figure 1. – Index of economic freedom and GDP in Ukraine 1991–2017

Source: [6].

The period from 2009-2015 characterizes by financial and economic instability that discourage capital formation, and could be seen in the falling part of the curves GDP and index of economic freedom (See Figure 1). The dramatic depreciation of the Hryvnia had a devastating effect on the balance sheet of enterprises. The analysis of Ukrainian macroeconomic data depicts on the tendency of industrial production shortage in heavy industry, including metallurgy and coal-mining industry. It explains through the high production costs, inefficient labor organization, and undeveloped infrastructure. The analysis of economic assessment of Ukrainian competitiveness in 2012 shows the market concentration at national level and the high degree between regional markets. The competition is still weaker at regional level. Concentration has a negative and highly significant effect on labor productivity growth [5].

Following at the latest updates of the overall situation in Ukraine we can say that it has overcome the heavy crisis caused by armed conflict in eastern part of country. At the same time, 200 % devaluation of Ukrainian national currency (hryvnia) in 2014-2015 made Ukrainian goods and services cheaper and more competitive. In 2016, for the first time since 2010, the economy grew more than 2 %. Ukraine's GDP amounted to approximately 93.26 billion U.S. dollars in 2016.

The regional competitiveness estimation of 12 Ukraine's regions based on the methodology of Global Competitiveness Index (GCI) examines that Kyiv, Dnepropetrovsk, Sumy, Donetsk. These indicators demonstrate the low labor productivity per capita in the Ukraine comparing to world competitiveness estimation in 55 countries. Lvov ranked on the first tier of regions between Croatia and behind Vietnam in 2005. The second tier of regions includes Poltava, Crimea and Vinnitsa regions. It takes positions below Ukrainian average but ahead of Argentina. The third group Kherson and Cherkassy occupies a very low position between Uruguay and behind Bosnia and Herzegovina (Table 1) [7]. The scores of the best and worst performing regions make up 5 percent above or below the national average. The estimation results point out the lower level divergence in terms of GRP per capita. Hanouz, Geiger and Panov (2008) [7] make a conclusion that the degree of economic divergence between Ukrainian regions is moderate comparing to other countries. Gross regional product (GRP) per capita is the most significant index characterizing the regional potential for producing goods and services. Innovation activities in countries behind the technology frontier, such as Ukraine, focus mainly on the adaptation of machinery, equipment and software [8].

Table 1. – Competitiveness of Ukraine's regions

Rank	Country/ Economy/ Region	Score	Rank	Country/ Economy/ Region	Score
52	Croatia	4,25	74	Donetsk	4,07
53	Kyiv	4,25	75	Ukraine	4,07
54	Dnepropetrovsk	4,24	76	Botswana	4,07
55	Cyprus	4,23	77	Egypt	4,06
56	Kazakhstan	4,23	78	Poltava	4,02
57	Zakarpattia	4,22	79	Philippines	4,02
58	EL Salvador	4,20	80	Romania	4,00
62	Russian Federation	4,14	81	Crimea	3,99
63	Lvov	4,14	82	Vinnitsa	3,98
64	Jamaica	4,14	83	Argentina	3,98
68	Costa Rica	4,10	90	Uruguay	3,91
69	Khmelnytsky	4,10	91	Kherson	3,90
70	Brazil	4,10	92	Bosnia and Herzegovina	3,86
72	Vietnam	4,08	93	Cherkassy	3,85
73	Sumy	4,07	94	Armenia	3,82

Source: [7].

Ukraine scored 56.99 points out of 100 on the 2018 Global Competitiveness Report published by the World Economic Forum in 2018. Covering 141 economies, the Global Competitiveness Index measures national competitiveness – defined as the set of institutions, policies and factors that determine the level of productivity. Competitiveness Index in Ukraine averaged 16.02 Points from 2007 until 2019, reaching an all time high of 57.03 Points in 2018 and a record low of 3.90 points in 2011 [9; 10]. The report draws attention to various areas in which Ukraine's competitiveness has faltered on regressed. Macroeconomic stability has dropped two places.

Matteo et al. [11] proves that without complementary investments, it will not be possible fully benefit from the advantages of ICT capital for productivity growth.

The deteriorated domestic and external demand affects the output decrease in the major sectors of Ukrainian economy. The volume of industrial production, fixed capital investment, exports and imports of goods and services have decreasing tendency. The consumer price index is increased. The current account and financial account deficit is covered by the interventions of the National Bank of Ukraine. The regional development illustrates an increase in territorial unevenness and aggravation of socio-economic and political problems in the country.

2. The model of the regional innovation development in Ukraine. Considering the regional innovation development, we apply hierarchical clustering analysis of Gross Regional Product (GRP) from the employment, industrial production index, fixed capital investment index, the number of organizations, conducting scientific research, total value of innovation costs per one thousand employed workers and foreign direct investment (FDI). The hierarchical clustering analysis is conducted using the SPSS Statistics program. The employment defines labor in the region. Industrial production index, and fixed capital investment index determine regional capital. The number of organizations, conducting scientific research, total value of innovation costs per one thousand employed workers and FDI in region denote total factor productivity. We test the following hypothesis: the dependence of regional cluster classification on the input factors of production combination in regions. The data of State Statistics Service of Ukraine used for assessment GRP from variables defining regional development for 27 Ukrainian regions in 2013 [12].

We assess calculating distances between the most developed regions and the undeveloped regions in hierarchical clustering. We estimate the single linkage criteria, showing the distance between the closest neighboring points. The estimation results outline that the Kyiv region is distinguished from other regions. Capital Kyiv is considered outlier from other Ukrainian regions for all estimated periods of time.

The strong specialization by regions producing specific kinds of heavy industry products caused to the division between highly industrialized developed regions with high urbanization and backward rural regions with agrarian orientation in the Ukraine. The centralized industrial organization and the inefficient regional structure formation resulted in the disproportionate regional division in the former Soviet Union. Low demand and liquidity problems remained the major impediments for business development for Ukrainian industrial enterprises in 2013. Other important barriers to development were excessive taxation (which includes tax rates and tax administration) and unfavourable regulatory climate. Enterprise managers assessed investment climate in 2013 as unfavourable. The share of the enterprises that considered the year 2013 to be “unfavourable for the purchase of equipment”, the indicator that measures investment environment, increased by 13.9% to 71% in 2013. According to the results of the survey conducted in the 1st quarter of 2014, among major obstacles that hampered investment activity of companies in 2013 were insufficient income (45.5%), unstable political situation (34%), and high cost of capital (28.7%). [13].

The present structure does not consider the geographical location, the economic endowment, and regional specificity. The application Ward's method calculates the simple Euclidean distances from each case in a cluster

to the mean of all variables. The graphical analysis of the line of the significant coefficients Ward's method proves the basic three clusters determination. The three clusters differ in particular in regarding to the levels of industrial development and scientific potential. It should be noted the increase of heterogeneity with every step of econometric analysis. A hierarchical clustering model of 27 regions is graphically represented at the dendrogram of regional cluster c classification on the input factors of production combination in regions.

Classification on the input factors of production combination in regions demonstrates that each region has various distributions. It is evident that the first cluster includes the cities of Kyiv, Kharkov, Dnepropetrovsk and Donetsk (Figure 2).

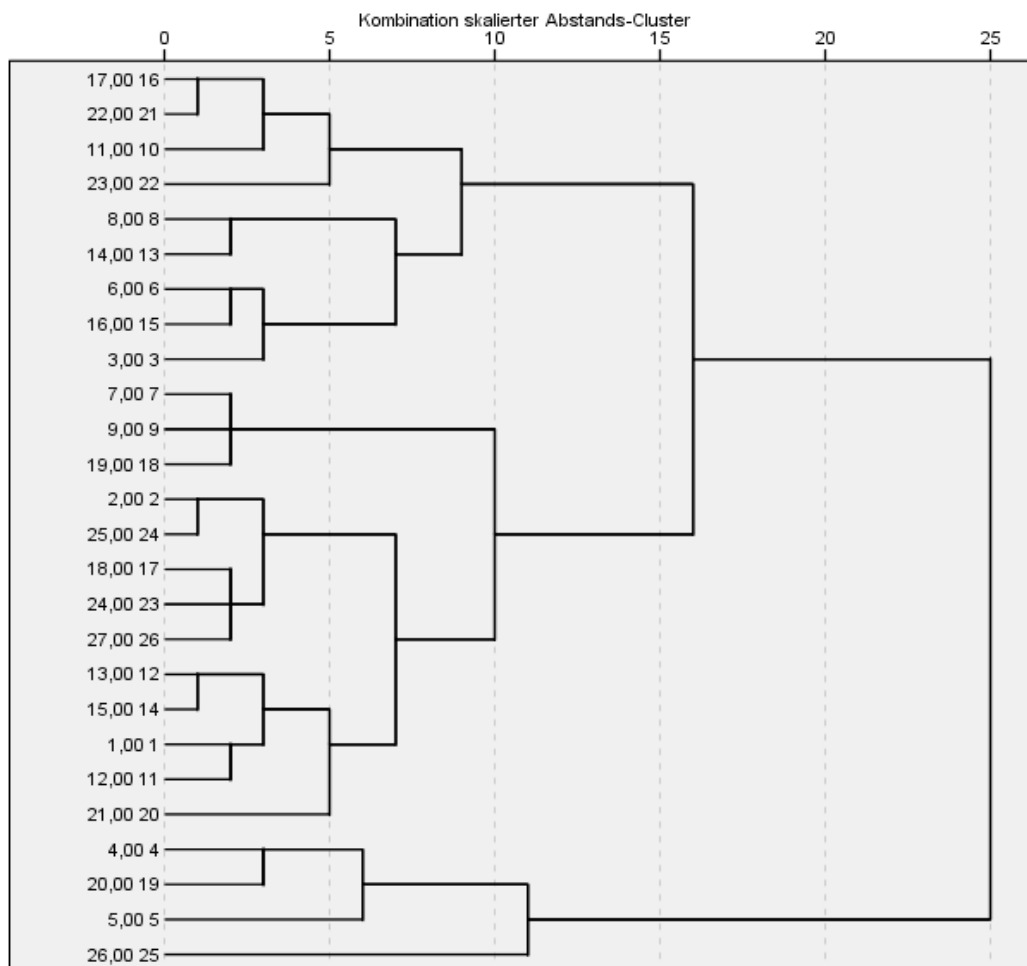


Figure 2. – Dendrogram of regional cluster classification on the input factors of production combination in regions

The application of hierarchical cluster analysis for 27 Ukrainian regions in 2013 demonstrates the presence of significant differences in the level of economic, scientific potentials, and confirms the low convergence between three clusters. The sufficient industrial and scientific endowment inheritance creates opportunities to exploit potentials and to improve position in cluster 2 in the rest regions. The research

The assessment of GRP from variables of the employment, industrial production index, fixed capital investment index, the number of organizations, conducting scientific research, total value of innovation costs per one thousand employed workers and FDI strengthens the dependence of regional cluster classification on the input factors of production combination in Ukrainian regions.

The first cluster shows relatively higher than average level of economic estimation in comparison with two others. It distinguishes via the biggest industrial production concentration, the attraction of the significant financial flows of capital, the highest innovation capacity within regions, and more than average per capita income in comparison to Ukraine. Within this period, there was the structural break, which could be seen in the given assessment. The real GDP index decreases, inflation (consumer price index), public debt, unemployment rate increases in 2013. The current account balance was negative. The business activity decreases, macroeconomic instability and insufficient quality of institutions constitute a major impediment to Ukraine's regional economic performance as reflected in the regional indicators for 2013 [14]. The regional content of the cluster 2 and the cluster 3 shows as unstable and changeable for all estimation

periods. The industrial, scientific potential of these regions are significantly low in comparison to the cluster 1. The cluster 2 and cluster 3 include some regions, which are specialized in agrarian production. The cluster mobility shows the low spread in economic development between regions.

The estimation results prove the necessity of applying effective regional policy at the state level of innovative development. Strategic tasks of the state policy for regional development of Ukraine: increasing the competitiveness of the regions and strengthening their resource potential; ensuring the development of human resources; determination of spheres innovative breakthrough, development of interregional cooperation; creation of institutional conditions for regional development.

3. The regional policy: development and implementation options. The Ukraine's regional policy has a priority tasks reflecting the solution uneven development of regions, urban development, restructuring of rural areas, rehabilitation of areas affected by industrial decline and natural disasters. The solution of the basic goals and tasks of regional policy needs the mechanism for implementation of regional programs in Ukraine at the level of cities and villages. The Republic Poland experience of modernization regional policy mechanism demonstrates the establishment of the special coordinating authorities, the so-called intra-regional policy, which implemented by the voivodship self-government bodies in order to achieve its own objectives based on its own funds, and under its own responsibility, but with financial support from the state budget and the European Union. The main implementation tool is regional operational programs.

The urgency for further development and implementation of the National Strategy for Regional Development of Ukraine is creation central coordinating body in the system of executive bodies to ensure effective formation and implementation of the state regional policy. The Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine fulfills the functions of coordinating the development and state registration of agreements on regional development, scientific and methodological support of activities in this area of executive power bodies and local self-government bodies, as well as development within their powers and ensuring. In accordance with the Ukrainian legislation, the implementation of the state regional policy simultaneously entrusted to the Ministry of Economy of Ukraine. The determination priorities of the state policy and appropriate scientifically based spheres of investment are the economic and social components for innovative regional development. The regulatory mechanism of effective adoption and implementation of regulatory acts aimed at ensuring and accelerating domestic regional development.

The innovative regional policy includes the active and comprehensive state, special and regional authorities' policy of financial support of newly created structures and their potential creators of techno parks, technical development centers and other innovative institutions for R&D application and implementation innovative projects. The development of attractive labor force policy for young and highly skilled specialists suggest creation new working places based on joint ventures, foreign companies and their affiliates in Ukraine.

The innovative breakthrough in regional development considers the active state policy, building up administrative capacity at local and regional levels, comprehensive regulatory support of innovative activity, and formation favorable institutional environment.

Summary and conclusions. The implementation of regional economic policy provides necessity to paying attention to the innovative component. Clusters' creation of innovation development in the form of technology parks is the strategy for innovative development in regions. The mechanisms of technology parks implementation consider based on zones with attractive innovation climate. The favorable law legislation, tax exemptions, access to financial sources, availability of office production infrastructure, telecommunications, conditions for comfortable living standards are vivid components for analyzed mechanism.

In the process of cluster model application, it should be noted the crucial role of forms of private public partnership. State is responsible for legal initiatives in providing policy for innovative environment formation. Entrepreneurs are the basic innovators who apply innovative ideas, and implement innovative projects.

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ЭФФЕКТИВНАЯ ИННОВАЦИОННАЯ ПОЛИТИКА КАК ФАКТОР УСТОЙЧИВОГО РЕГИОНАЛЬНОГО РАЗВИТИЯ

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Приведен анализ влияния инновационной политики на эффективное региональное развитие в Украине. Определены причины региональных диспропорций, дана оценка роли инновационной политики в региональном развитии. Принятие и применение мер инновационной политики создает основу для сглаживания неравенства и повышения конкурентоспособности регионов Украины.

Ключевые слова: *инновации, развитие, входные факторы производства, инновационная политика.*