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# THE INFLUENCE OF INNOVATIVE POTENTIAL ON GROSS PRODUCTION AND ECONOMIC SECURITY: REGIONAL ANALYSIS

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## ABSTRACT

*The level and management of economic growth of territories in modern conditions largely depends on the introduction of innovations and structural changes. The purpose of the research paper: to study the level of gross production, economic security and innovation potency in the regions, to develop mechanisms to stimulate economic growth in various regional clusters. The study methods were: statistical analysis innovation and economic performance, data grouping, tree-like clustering method based on Euclidean distances is selected, discriminant analysis. The study revealed a low level of gross production in Ukraine, which is proven by comparing similar indicators in EU countries. The non-harmoniousness of gross production and economic development in the regions of Ukraine is also observed (according to many indicators Kyiv city has significant advantages in the economy of the regions of Ukraine). Through empirical studies it has been proved that spatial unevenness of innovative opportunities of Ukrainian regions affects economic growth. The presence of significant innovative potential is an advantage and an opportunity for the region to improve economic development. Based on the results of empirical research, 2 regional clusters were identified. Cluster 1 has an average economic growth, but there is a high innovative potential that needs to be applied more effectively and these regions can become powerful economic and scientific centers after Kyiv city. Cluster 2 has average economic growth, but the innovation potential is lower. Its significant strengthening is necessary for regions with low innovation potential.*

**Keywords:** Economic security, Gross regional product, Innovation and technological development, Research, Management

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## 1. INTRODUCTION

During the 21st century, in the years 1944-1970, the gross product and kept the duration of the products (with different levels to different levels). Since the 1970s. the pace really informed the feelings and current issues of economic security [1, 2]. The system of economic security of the territory of the state includes the scientific theory of economic security, its structural components, public policy and strategy to improve economic security, methods, tools, incentives and ways to ensure security, the concept of economic security [3-5]. The level of economic security and gross production is influenced by many factors, from political and institutional, legal, financial (budget, debt changes, fiscal burden, the development of the financial market) [6], the development of industrial production (growth rates and structure of industrial production) [4, 7], foreign trade balance, inflationary changes and fluctuations, investment and investment in the real sector of the economy, the development of small enterprises [8]. However, innovation is a particularly important factor in today's variable environment of change. The introduction of innovations can significantly affect the level of economic security to increase productivity, energy efficiency of production, affect the growth of gross regional product, reduce costs and improve product quality and thereby increase the competitiveness and export orientation of the regions and the state as a whole [9-12]. These issues are particularly relevant in Ukraine, in the transition economy.

The purpose of the research paper: to study the level of gross production, economic security and innovation potency in the regions, to develop mechanisms to stimulate economic growth in various regional clusters.

## 2. MATERIALS AND METHODS

The indicators that characterize Ukraine's economic security at the national level for 2007-2017 are used in the study. The choice of the time period for data analysis is chosen because of the availability and accessibility of data. Source of data: World Bank, State Statistics Service of Ukraine [13-17].

For the study, indicators have been selected that characterize the level of economic security and the level of innovative development of the regions of Ukraine: the gross regional product, the indices of the physical volume of the gross regional product, the gross regional product per capita, the cost of research and development by region, the number of employees involved in the implementation of scientific research and developments in the regions of Ukraine. In the regional context, data are available for 2017-2018, so these time periods are selected for the analysis and clustering of the regions in terms of economic security.

To determine the number of clusters, a tree-like clustering method based on Euclidean distances is selected [18]. On the basis of the constructed tree of clustering of objects, two clusters with medium and low level of economic security are defined. For further clustering the K-Means method is selected. The first stage of clusterization: the construction of a matrix of correlations and discriminatory statistics.

In the general case, the K-Means method builds exactly K different clusters located at possibly large distances from each other. Clustering begins with K randomly selected clusters, and then changes the affiliation of the objects to them to minimize the variability within the clusters and maximize the variability between the clusters.

Three clustering indicators were selected for clustering, characterized by the lowest level of deviations in the middle of the sample (the standard deviation in the middle of the sample population was minimal). These indicators are: indices of the physical volume of the gross regional product in 2017; costs for research and development by regions in 2017; the number of employees involved in the implementation of research and development by regions of Ukraine in 2017.

### **3. RESULTS AND DISCUSSION**

Thus, a grouping of regions was conducted and 2 clusters were allocated.

#### **3.1. Estimation of the level of economic security and innovation of the regions of Ukraine**

The level of economic security of Ukraine's regions can first be assessed by comparing Ukraine's ratings against other States. Ukraine ranks 83rd in 2018 from 140 countries in the Global Competitiveness Index, 85th in 2019 from 141 countries. In 2017, Ukraine ranked 135th out of 162 countries in the Index of Economic Freedom, in 2018, 150th out of 180 countries, and in 2019 147 out of 180 countries. That is, the rating of Ukraine in the index is characterized as a rating of economic freedom. In the Legatum Prosperity Index 2018, Ukraine ranked 111th out of 149 states in 2018, and in 2019 ranked 96th out of 167 states. This indicates a low level of economic security.

The economic security of Ukraine's regions depends heavily on high-tech industries, which, based on imported raw materials, produce finished products and export them. Five groups of indicators can be used to evaluate and cluster the level of economic security of regions in the conditions of innovative changes:

1. Gross regional product by region in Ukraine. It will allow to study the level of economic development of the region, the dynamics of growth/decrease in the level of economic development, the level of gross production per 1 person.
2. The indicator of science and technology development in Ukraine. It will allow to study the level of technology development in the regions, high-technology exports, patent applications.
3. Gross fixed capital accumulation by type of non-financial assets in Ukraine. Allows to analyze gross fixed capital accumulation in new technologies, innovative products, software, and intellectual property products.
4. Costs for research and development by type of work by regions of Ukraine. It will allow to analyze the level of costs for research and development.
5. The number of employees involved in the performance of research and development by regions of Ukraine. It will allow to analyze the number of scientific personnel in the regions, namely: researchers, doctors of Sciences, candidates of Sciences.

The dynamics of the Gross regional product level in the regions of Ukraine allows to state the economic decline in many regions (Donetsk, Kirovograd, Lugansk, Nikolaiv, Poltava, Cherkassy region) and a minimum growth of 3% in a number of regions (Vinnytsia, Dnipropetrovsk, Sumy, Kharkiv, Kherson, Chernihiv region). The average level of economic growth (Table 1) in Ukraine in 2017 was 102.5%. Analyzing Gross regional product per person it is worth noting that there is a large imbalance between the level of production in different regions. The income in Kyiv city is 3 times higher than the average in Ukraine, and in Transcarpathian region the income is 2 times less than the average in Ukraine. On average in Ukraine, the gross domestic product (GDP) per capita in 2017 is 8.667 dollars or 70233 uah (Ukraine ranks 110th in the world by this indicator). For comparison, in the European Union

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countries the total revenue is 41091 dollars (5 times higher than Ukraine), in Switzerland 65,006 dollars (8 times higher than Ukraine). These indicators show Ukraine's weak economic potential vis-à-vis other countries, including the neighboring countries, and may determine the low level of economic security overall.

**Table 1** Gross regional product by region in Ukraine in 2017 [13]

<b>Regions</b>	<b>Gross regional product (million UAH)</b>	<b>Indices of the physical volume of the gross regional product (in the prices of the previous year, percent)</b>	<b>Gross regional product per person (UAH)</b>
Ukraine	2983882	102,5	70233
Vinnitsia	92427	101,8	58384
Volyn	51972	105,3	49987
Dnipropetrovsk	313830	102,1	97137
Donetsk	166404	95,2	39411
Zhytomyr	61470	105,0	49737
Transcarpathian	43043	103,1	34202
Zaporizhia	130377	103,1	75306
Ivano-Frankivsk	63850	107,1	46312
Kyiv	157043	104,6	90027
Kirovograd	53031	98,6	55183
Lugansk	30285	83,8	13883
Lviv	147404	103,8	58221
Nikolaev	69371	99,1	60549
Odessa	149530	104,2	62701
Poltava	150904	97,2	106248
Rivne	48836	103,5	42038
Sumy	56530	100,2	51419
Ternopil	40747	105,6	38593
Kharkiv	187454	101,4	69489
Kherson	47868	100,8	45532
Khmelnitsky	63882	106,4	49916
Cherkassy	73176	98,3	59697
Chernivtsi	28591	103,5	31509
Chernihiv	56672	102,2	55198
Kyiv city	699185	105,7	238622

It is worth noting that in regions where high-tech production and export of machinery, equipment, chemical products, and aviation industry products are more developed, they are characterized by a high level of economic security. These regions include: Volyn, Kharkiv, Lviv, Ivano-Frankivsk, Sumy, Zaporizhia and others.

Indicators of Ukraine's scientific and technological development indicate a lack of innovation changes (Table 2). Exports of high technologies (aviation, engineering, and the chemical industry) are only 4.98% and increased by 36.27% over the ten years. The share of research and development costs in Ukraine's GDP is rather low.

**Table 2** The indicator of science and technology development in Ukraine in 2007-2017 [13]

Indicator Name	2007	2017	Growth, %
Trademark applications, total	32654	36777	12,63
Trademark applications, direct resident	19889	26276	32,11
High-technology exports (% of manufactured exports)	3,65	4,98	36,27
Research and development expenditure (% of GDP)	0,85	0,45	-47,43
Technicians in R&D (per million people)	324,34	176,65	-45,53
Researchers in R&D (per million people)	1455,01	1119,48	-23,06
Trademark applications, direct nonresident	12765	10501	-17,74
Patent applications, residents	3440	2283	-33,63
Patent applications, nonresidents	2723	1764	-35,22
Scientific and technical journal articles	5489	7219	31,53

It was 0.45% in 2017, decreasing by 36.27% over the years.

There is also a reduction of intellectual capital. During 2007-2017, the number of technical specialists, scientists in the field of scientific research and development significantly decreased. This has affected the negative dynamics of registered patents and trademarks. Accordingly, these trends negatively affect the level of economic security in Ukraine and in regions.

The share of research and development in the gross accumulation of capital in 2018 was 1.5% (Table 3). Major investments are made in residential buildings, machinery and equipment, other buildings and structures. Accordingly, there are no technological changes and introduction of innovations in Ukraine.

**Table 3** Gross fixed capital accumulation by type of non-financial assets in 2017 [17]

Indicators	In actual prices		In constant prices in 2010, percent to the previous year	
	million UAH	percent of total	volume change	change of deflator
Gross fixed capital accumulation, including:	610875	100,0	14,3	13,7
Residential buildings	86641	14,2	-8,6	22,9
Other buildings and structures	207858	34,0	11,8	22,5
Machinery and equipment	272423	44,6	19,3	5,1
Armament systems	18421	3,0	-	14,3
Cultivated biological resources	3806	0,6	28,7	17,8
Expenses related to the transfer of property rights to unproductive assets	1	0,0	-	-
Intellectual Property Products, Including:	21725	3,6	24,1	15,9
research and development	8830	1,5	24,2	22,5
exploration and evaluation of mineral deposits	335	0,1	-31,7	13,9
computer software and databases	11823	1,9	26,9	11,5
entertainment programs and originals of literary and artistic works	737	0,1	24,0	16,8

In 2017, the total expenditures for the implementation of the R&D by the organization's own forces amounted to 16773.7 million UAH, including labor costs - 8553.0 million UAH, other current expenditures - 7456.3 million UAH, capital expenditures - 764.4 million UAH, including the purchase of equipment - 588.0 million UAH. (Table 4).

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**Table 4** Costs for research and development by type of work by regions of Ukraine in 2017, UAH million [13]

Regions	Total in actual prices	Including for the performance of		
		fundamental research	applied scientific research	scientific and technological (experimental) developments
Ukraine	16773,7	3756,5	3568,3	9448,9
Vinnitsia	49,1	22,4	15,5	11,2
Volyn	18,4	6,8	5,0	6,6
Dnipropetrovsk	2029,8	148,8	147,9	1733,1
Donetsk	16,2	5,0	6,6	4,6
Zhytomyr	30,6	11,4	10,8	8,4
Transcarpathian	75,1	19,3	30,1	25,7
Zaporizhia	1387,9	15,8	198,2	1173,9
Ivano-Frankivsk	47,9	4,4	34,2	9,3
Kyiv	410,8	95,0	132,7	183,1
Kirovograd	100,8	3,3	9,4	88,1
Lugansk	36,9	3,1	17,8	16,0
Lviv	426,8	187,9	126,2	112,7
Nikolaev	330,7	36,0	34,3	260,4
Odessa	299,2	107,6	94,9	96,7
Poltava	80,7	25,4	25,9	29,4
Rivne	19,3	6,0	11,0	2,4
Sumy	182,4	19,3	50,0	113,1
Ternopil	30,2	6,2	20,6	3,4
Kharkiv	3144,4	570,7	614,4	1959,3
Kherson	81,2	23,6	53,6	4,0
Khmelnitsky	21,3	14,9	2,7	3,7
Cherkassy	98,6	27,8	35,8	34,9
Chernivtsi	87,9	25,6	56,0	6,3
Chernihiv	49,3	9,1	24,3	15,9
Kyiv city	7718,2	2361,1	1810,4	3546,7

The share of total expenditures in GDP was 0.47%, including at the expense of the state budget - 0.17%. According to the data of 2017, the share of expenditures on R&D in GDP of the EU-28 countries averaged at 2.06%.

More than the average share of research and development costs was in Sweden - 3.4%, Austria - 3.16%, Denmark - 3.05%, Germany - 3.02%, Finland - 2.76%, Belgium - 2.58%, France - 2.19%; smaller part - in Romania, Latvia, Malta, Cyprus and Bulgaria (from 0.5% to 0.75%).

In 2017, 22.4% of the total expenditures were spent on fundamental research, which 91.9% was financed from the budget. The share of applied research expenditures amounted to 21.3%, which was 58.1% financed at the expense of the budget and 23.6% at the expense of the enterprises of the entrepreneurial sector. For implementation of scientific and technological (experimental) development, 56.3% of total expenditures were directed, which was 36.1% financed by foreign firms, by 32.1% by enterprises of the business sector and by 12.5% by own funds. Almost half of the amount spent on fundamental research was allocated to the natural sciences, 24.8% - technical, 8.7% - agricultural. 37.8% of expenditures of the branch of

technical sciences, 23.2% - natural sciences, 12.9% - medical and agricultural, directed to applied scientific researches. The largest part (88.9%) of expenses for the implementation of scientific and technological (experimental) development falls on the branch of technical sciences.

There are also significant imbalances in investment in research and development in various regions of the state. For example, slightly less than half of all research and development expenditures were made in Kyiv city 7718.2 million uah. However, there are regions where such investments are minimal: Volyn, Donetsk, Rivne, Khmelnytsky, Ternopil, Zhytomyr region (Table 4).

In 2017, the share of the research workers (researchers, technicians and support staff) in the total number of the employed population was 0.54%, including researchers - 0.35% (Table 5). According to Eurostat, in 2016 the highest share was in Denmark (3.18% and 2.2%), Finland (3.04% and 2.26%), Great Britain (2.29% and 1.68%) and the Netherlands (2.28% and 1.39%); the lowest was in Romania (0.54% and 0.34%), Cyprus (0.87% and 0.62%), Bulgaria (1.09% and 0.71%) and Poland (1.08% and 0.83%). The share of doctors of science and doctors of philosophy (candidates of science) among the artists of the R&D was 29.3%, among researchers – 44.7%. It is worth noting that in all previous indicators there is a significant discrepancy between different regions (Table 5). The number of employees involved in the performance of research and development in Kyiv city makes up half of the total number in Ukraine. However, the number of researchers in Volyn, Donetsk, Zhytomyr, Rivne, Ternopil, Khmelnytsky is minimal.

More than half of the total number of Doctors of Sciences and Doctors of Philosophy (Ph.D.), who carried out research and development, worked in organizations of the state sector of the economy, 35% - higher education, 5% - entrepreneurship sector.

**Table 5** The number of employees involved in the performance of research and development by regions of Ukraine in 2017, persons [13]

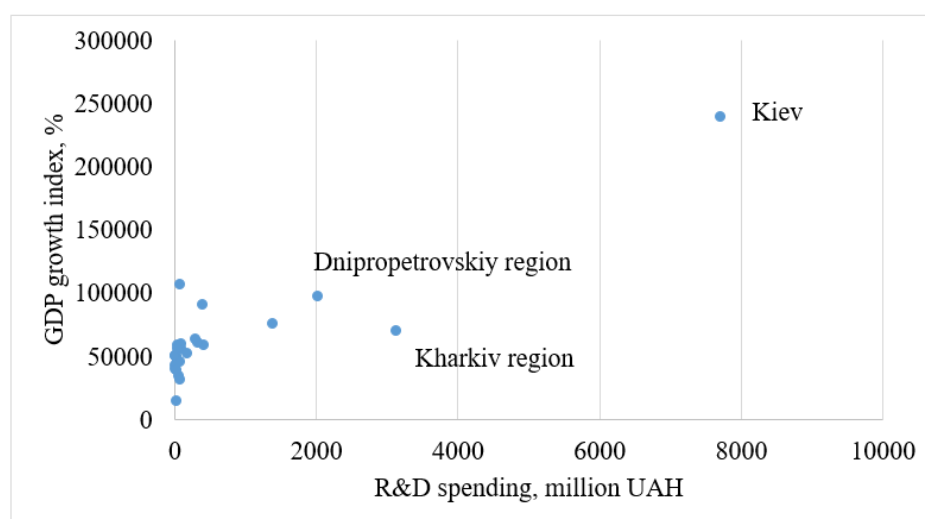
Regions	Total of workers	Including				
		With a degree		researchers	engineers	support staff
		doctor of sciences	Doctor of Philosophy (Ph.D.)			
Ukraine	88128	7043	18806	57630	8553	21945
Vynnytsia	625	65	214	447	93	85
Volyn	317	36	116	265	37	15
Dnipropetrovsk	8658	383	1018	5216	1887	1555
Donetsk	226	25	40	158	42	26
Zhytomyr	367	34	118	244	61	62
Transcarpathian	526	45	117	314	19	193
Zaporizhia	3913	78	215	1295	404	2214
Ivano-Frankivsk	600	59	132	492	33	75
Kyiv	1798	85	308	1098	233	467
Kirovograd	467	11	67	353	41	73
Lugansk	301	12	33	168	45	88
Lviv	4869	585	1771	3862	244	763
Nikolaev	2116	93	286	1073	143	900
Odessa	2548	265	631	1818	227	503

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Regions	Total of workers	Including				
		With a degree		researchers	engineers	support staff
		doctor of sciences	Doctor of Philosophy (Ph.D.)			
Poltava	1016	79	360	763	99	154
Rivne	340	46	102	232	46	62
Sumy	1638	86	289	888	396	354
Ternopil	345	55	110	293	26	26
Kharkiv	14226	1008	2915	9528	1493	3205
Kherson	699	51	180	472	86	141
Khmelnitsky	348	32	115	295	22	31
Cherkassy	676	50	129	449	124	103
Chernivtsi	731	94	251	569	48	114
Chernihiv	665	8	89	265	46	354
Kyiv city	40113	3758	9200	27073	2658	10382

In 2018 44.7% of researchers were women, of whom 7.3% had the degree of Doctor of Sciences and 34% Ph.D degree. The share of female researchers in the field of public (65.8%), medical (65.2%) and humanitarian (60.3%) sciences was higher than average, lower 34.1% in the technical sciences field (Figure 1).

The regions of Ukraine are characterized by the dependence of gross product, economic security on the level of innovative technologies. A higher level of research and development costs corresponds to a higher level of gross regional product. The regions of Ukraine are characterized by the dependence of gross regional product, economic security on the level of innovative technologies. A higher level of research and development expenditure corresponds to a higher level of gross regional product.



**Figure 1** Dependence of the index of the physical volume of the gross regional product on the costs of research and development by regions of Ukraine [13]

### 3.2. Cluster analysis of regions of Ukraine on the level of economic security

Clusterization requires the definition of variables that are characterized by the minimum values of the variation of the sample population (Table 6).



**Table 6** Descriptive statistic

<b>Indicators</b>	<b>GDP</b>	<b>GDP growth index</b>	<b>GDP per capita</b>	<b>R&amp;D spending</b>	<b>R&amp;D specialists</b>
Mean	119355,28	101,66	63172,04	670,95	3525,12
Standard Error	27539,27	0,96	8371,02	328,86	1651,55
Median	63882,00	103,10	55183,00	81,20	676,00
Standard Deviation	137696,34	4,79	41855,12	1644,32	8257,74
Sample Variance	18960282556,38	22,92	1751850675,46	2703797,18	68190323,53
Kurtosis	13,69	7,44	13,36	14,96	17,39
Skewness	3,43	-2,31	3,28	3,71	4,01
Range	670594,00	23,30	224739,00	7702,00	39887,00
Minimum	28591,00	83,80	13883,00	16,20	226,00
Maximum	699185,00	107,10	238622,00	7718,20	40113,00
Sum	2983882,00	2541,60	1579301,00	16773,70	88128,00
Count	25	25	25	25	25

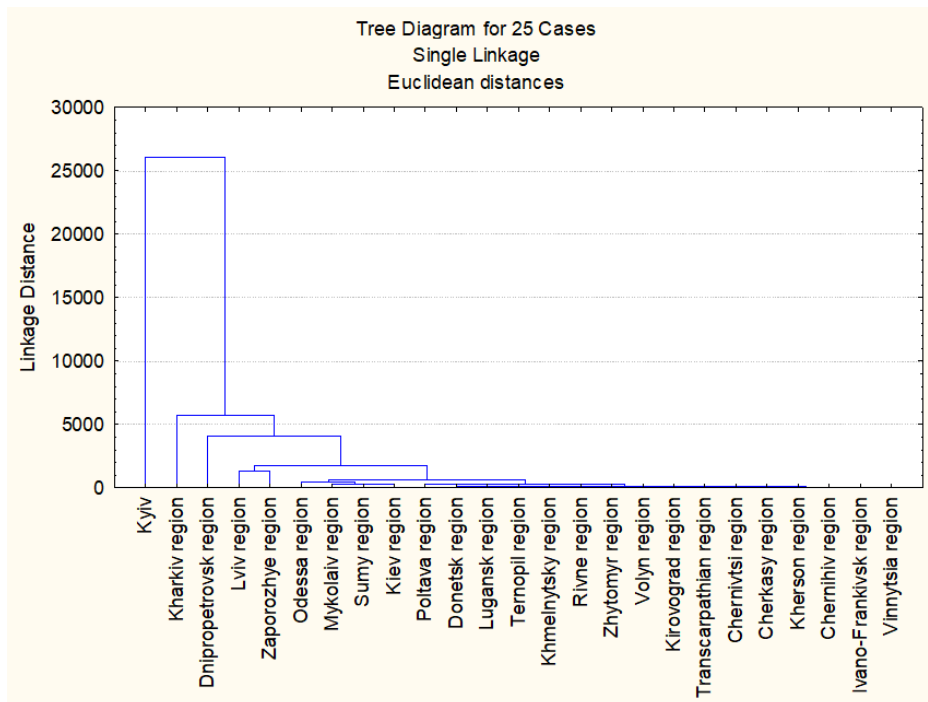
The data in Table 6 indicate that for the cluster analysis, it is expedient to select the index of the physical volume of the gross regional product, since the standard error and standard deviation are minimal, and this will not affect the quality of clustering. Variation in the sample is significant, which indicates significant regional differences in the area of economic security of the regions and, in particular, in the innovation sector. Change of the indices of the physical volume of the gross regional product has a direct relationship with the cost of research and development and the number of employees involved in the implementation of research and development (Table 7). A higher degree of correlation is observed between the GDP per capita by region and the cost of research and development and the number of employees.

**Table 7** Matrix of correlations of variables

<b>Indicators</b>	<b><i>GDP growth index</i></b>	<b><i>GDP per capita</i></b>	<b><i>R&amp;D spending</i></b>	<b><i>R&amp;D specialists</i></b>
GDP growth index	1			
GDP per capita	0,256	1		
R&D spending	0,180	0,881	1	
R&D specialists	0,187	0,890	0,992	1

To determine the number of clusters, a tree-like diagram for 25 regions of Ukraine was constructed according to indicators (Figure 2): indices of the physical volume of the gross regional product in 2017; the cost of research and development by region in 2017; the number of employees involved in the implementation of research and development by regions of Ukraine in 2017.

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**Figure 2** Tree diagram for 25 region of Ukraine by the level of economic safety

The regional assessment allows tracking two major clusters in terms of economic security and innovative development. They can be conventionally divided into a cluster with a low level of economic security and an average level of economic security. It is expedient to remove the city of Kyiv, because indicators are characterized by values higher than average values.

The average economic growth of regions of the first cluster is 101.75. The cost of research and development amounted to an average of 2587.10 million UAH. The average number of employees involved in research and development is 11,442 (Table 8).

**Table 8** Descriptive Statistics for Cluster 1

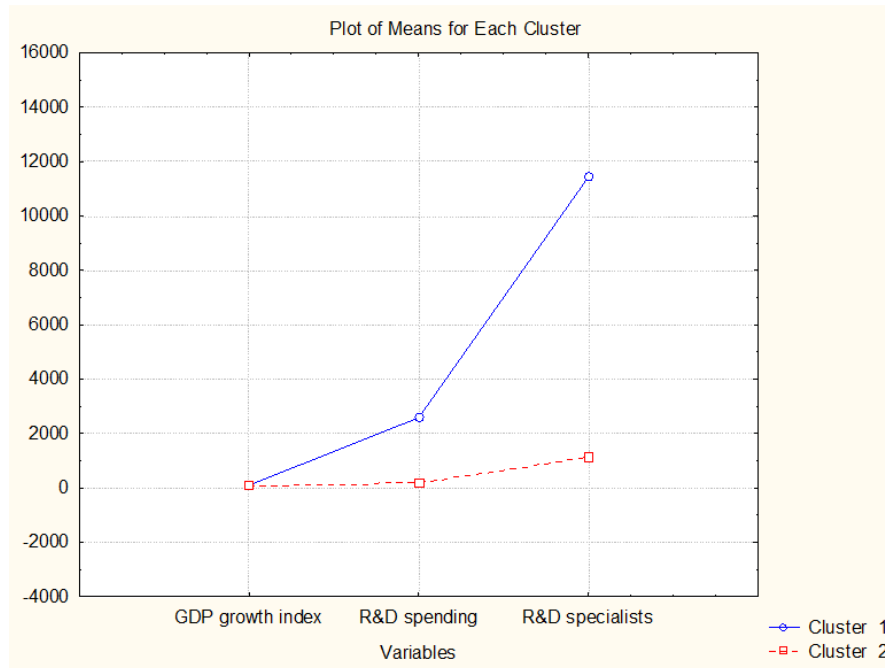
Indicators	Mean	Standard deviation	Variance
GDP growth index	101,75	0,495	0
R&D spending	2587,10	788,141	621167
R&D specialists	11442	3937	15501310

The average economic growth of the regions of the second cluster is 101.47. The cost of research and development is on average 176.42 million UAH. The average number of employees involved in research and development - 1142 persons (Table 9).

**Table 9** Descriptive Statistics for Cluster 2

Indicators	Mean	Standard deviation	Variance
GDP growth index	101,473	5,037	25
R&D spending	176,423	299,421	89653
R&D specialists	1142	1236	1529959

Clusters differ significantly in terms of costs and number of employees, but the level of economic security is practically the same (Figure 3).



**Figure 3** Plot of mean for each Cluster

The first cluster contains two regions: Dnipropetrovsk and Kharkiv, which differ significantly from other regions of Ukraine in terms of costs and number of specialists in the field of research and development. However, these regions are not characterized by significant growth of the gross regional product. This points to other factors that affect their level of economic development. The regions of this cluster are also characterized by a high level of gross regional product, but not the highest among other regions and an average level of economic growth. The regions of the cluster have a high innovative potential that can be more effectively implemented, this is the key advantages of the regions. These regions have the greatest opportunities to become centers of economic development and innovation after Kyiv as soon as possible.

The second cluster included 22 regions of Ukraine. The areas of this cluster are characterized low level of innovation costs, they have a smaller number of scientific personnel. In this cluster, it is worth highlighting Lviv, Zaporizhia, Odessa, Nikolaev, Kiev, Sumy region which also have a very significant innovative and scientific potential, which is worth applying for rapid economic growth. Other regions of Ukraine have much lower innovation potential.

Today, economic development in the conditions of innovative changes in the regions of Ukraine is at a low level due to the following stable trends:

- relatively low level of gross regional product per person
- insufficient share of high-tech exports in the structure of production and export;
- low level of knowledge intensity of domestic production, which is manifested not only by lack of funds or lack of incentives and privileges;
- low amount of funding for scientific and technical works in general, and especially at the expense of the state budget;
- insufficient activity of scientific and technical works at enterprises, financing of development, fundamental and applied researches and their introduction into production.

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The main factors of management of economic security and stimulate economic growth in the regions of cluster 1 and part of the cluster regions 2 (Lviv, Zaporizhia, Odessa, Nikolaev, Kyiv, Sumy region) in the conditions of innovative changes can be:

- directing to certain parts of the internal and external markets on which domestic producers can obtain competitive advantages for a short time, based on domestic favorable economic conditions;
- optimizing of the use of the results of sound and practical research, while drawing on the benefits that reveal the processes of interregional cooperation, integration and globalization;
- accelerating the development of the processing industry, including high-tech and high-tech industries, support in the process of development and introduction into production of new types of products;
- focusing on the growth of the range and the composition of promising technologies, ensuring an increase in the added value of primary resources.

Necessary measures in management of economic security and stimulate economic growth in the regions of cluster 1 and part of the regions of cluster 2 (Lviv, Zaporizhia, Odessa, Nikolaev, Kyiv, Sumy region) are also:

1. Development of innovative culture and improvement of innovative infrastructure is a favorable environment for the creation of enterprises and the increase of progressive technological sectors.
2. Promotion of environmental innovations: introduction of energy-efficient, resource-saving technologies, development of alternative energy sources, as well as the introduction of environmentally friendly industries.
3. Formation of policy to support innovation through a favorable regulatory environment, the election on competitive terms of regional innovation projects, to attract international innovation projects and programs for the development of innovation.

### 4. CONCLUSION

The conducted research testifies to the low level of economic security and gross production of Ukraine, in comparison with other states, including in the regions. The lack of innovation with a high innovation potential is confirmed by a small share of total expenditures in GDP, low costs for new developments in the presence of a large number of scientific personnel in the regions of Ukraine. Therefore, the state of innovation, technical development and implementation of scientific research available in Ukraine does not sufficiently stimulate economic development. At the same time, it is proved that regions with a higher level of innovation are able to provide higher growth rates of the region's economy. The direct link between economic growth and innovation is empirically confirmed. Ukraine also has significant regional imbalances in innovation potential and gross regional product. Today, about half of the development investment is in Kyiv city. Regions with significant innovation potential that can become powerful research and economic growth centers after Kyiv city are Dnipropetrovsk and Kharkiv. Quite significant innovative potential also have Lviv, Zaporizhia, Odessa, Nikolaev, Kiev, Sumy region. In these regions, research and development should be more intensively stimulated and put into production. Empirical research has revealed innovative threats that hinder economic growth in other regions of the state, among them: the low number of employees engaged in research and development; reduction of intellectual capital; reduction of production in high-tech industries; reduction of research and development costs. In such regions, it is necessary first of all to build up the innovative potential and increase the efficiency of its use.

## REFERENCES

- [1] Stone, C., Trisi, D., Sherman, A. and Beltran, J. A Guide to Statistics on Historical Trends in Income Inequality. *Center on Budget and Policy Priorities*. <https://www.cbpp.org/research/poverty-and-inequality/a-guide-to-statistics-on-historical-trends-in-income-inequality>
- [2] Fagerberg, J. Innovation policy: rationales, lessons and challenges. *Journals of Economic Surveys*, **31**(2), 2016, pp. 497-512. <http://doi.org/10.1111/joes.12164>
- [3] Sulphery, M. and Alkahtani, S. Economic security and sustainability through social entrepreneurship: the current Saudi scenario. *Journal of security and sustainability*, **6**(3), 2017, pp. 481-490. [http://dx.doi.org/10.9770/jssi.2017.6.3\(12\)](http://dx.doi.org/10.9770/jssi.2017.6.3(12))
- [4] Radvila, O. Economic security of the machine-building industry: the growth of economic potential. *Economic Innovations*, **67**, 2018, pp. 168-175.
- [5] Kasitova, E. External and internal threats to the economic security of the Eurasian Economic Union. *Management of Investments and Innovations*, **2**, 2018, pp. 43-49.
- [6] Dash, Z. Economic Security: The Missing Link in India's National. *Strategic Analysis*, **42**(6), 2018, pp. 633-639.
- [7] Turvey, R. Economic diplomacy and security: linkages, trends and changes. *International Journal of Diplomacy and Economy*, **2**(2), 2014, pp. 4-22. <http://doi.org/10.1504/IJDIPE.2014.060754>
- [8] Roy, R., Chan, N. and Raini, R. Development of Indicators for Sustainable Rice Farming in Bangladesh: A Case Study with Participative Multi-Stakeholder Involvement. *World Applied Sciences Journal*, **22**(5), 2013, pp. 672-682. <http://doi.org/10.5829/idosi.wasj.2013.22.05.2890>
- [9] Fan, P. Innovation in China. *Journals of Economic Surveys*, **28**(4), 2014, pp. 725-745. <http://doi.org/10.1111/joes.12083>
- [10] Kuznetsova, M. Innovation management as part of economic security. *Journals National Interests: Priorities and Security*, **15**(1), 2019, pp. 53-63.
- [11] Petrariu, I. R., Bumbac, R. and Ciobanu, R. Innovation: a path to competitiveness and economic growth. The case of CEE countries. *Theoretical and Applied Economics*, **20**(5), 2013, pp. 15-26.
- [12] Hu, A. G. Innovation and Economic Growth in East Asia: Asian Economic Policy. *Journals of Economic Surveys*, **10**(1), 2015, pp. 19-37. <http://dx.doi.org/10.1111/aepr.12078>
- [13] Ukraine. The World Bank indicators. *The World Bank*, 2019. <https://data.worldbank.org/country/ukraine>
- [14] The number of employees involved in R & D by region in 2018. *State Statistics service of Ukraine*. <http://www.ukrstat.gov.ua>
- [15] Scientific staff and number of organizations. *State Statistics service of Ukraine*. <http://www.ukrstat.gov.ua>
- [16] Spending for research and development by type of work by region in 2018. *State Statistics service of Ukraine*. <http://www.ukrstat.gov.ua>
- [17] Gross fixed capital accumulation by type of nonfinancial assets in 2018. *State Statistics Service of Ukraine*. <http://www.ukrstat.gov.ua>
- [18] Omelyanenko, V. and Biloshkurskyi, V. Methodology of national investment and innovation security analytics. *Problems and Perspectives in Management*, **17**(1), 2019, pp. 380-394. [http://dx.doi.org/10.21511/ppm.17\(1\).2019.33](http://dx.doi.org/10.21511/ppm.17(1).2019.33)
- [19] Valeriy Anatolevich Tsvetkov, Alexandr Georgievich Gurinovich, Ilya Vladimirovich Afanasiev, Mark Socratovich Anastasov, Marina Nikolaevna Vrazhnova and Vladimir Vladimirovich Churin, Effective Management of a Company's Economic Security: 21st Century Challenges, *International Journal of Civil Engineering and Technology*, **10**(2), 2019, pp. 1810-1820.
- [20] Vadim Faruarovich Islamutdinov and Anastasiya Nikolaevna Ustyuzhantseva, The Model to Assess Economic Security of Fuel and Energy Complex Enterprises of the Northern Resource-

## The Influence of Innovative Potential on Gross Production and Economic Security: Regional Analysis

Producing Region Taking into Account the Behavioral Aspect, *International Journal of Mechanical Engineering and Technology*, 9(8), 2018, pp. 1161–1171

- [21] Sameer Gupta and Sunil Bhardwaj, Relationship Between Gross Domestic Product and Derivative Market of India. *Journal of Management*, 5(3), 2018, pp. 205–215.
- [22] Ramayana, Rahmadhani Fitri, Melly Andriana, An Application Technology in Land and Regional Planning, *International Journal of Civil Engineering and Technology* 10(2), 2019, pp. 2287–2294