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Urgent problems of present-day economics' development, different ownership enterprises operation and development, investment and innovative activity, increasing national economy's competitiveness, regional development are reported.

It is intended for scientists, lecturers, postgraduate students, students and practitioners.

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РЕГІОНАЛЬНА ЕКОНОМІКА

UDC 339.138

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REGIONAL INNOVATION ECONOMY: ASPECTS OF ECONOMIC DEVELOPMENT

Urgency of the research. *Sustainable growth and improved living standards can only be obtained due to increasing of productivity and introducing new and better products and services that compete successfully in the global market. This is especially actually in the environmental field.*

Target setting *is to study environmental innovation in the regions, finding new ways to stimulate the ukrainian companies of national economy to implement innovation.*

Actual scientific researches and issues analysis. *Innovations as the basis of economic development are also of increasing interest to researchers (Edison H., Ali N. B., Torkar R., Heyne P., Boettke P. J., Prychitko D. L., Strumsky D.; Lobo J.; Tainter J. A., Gordon Robert J.) and many others.*

Uninvestigated parts of general matters defining. The research objective. *All the scientists examined the implementation of the classical theory of innovations. But innovations have a regional specifications. They should be considered separately for each region. The research objective is the justification for all these characteristics and their inclusion in the innovation process.*

The statement of basic materials. *In this work the main aspects of innovation activity has been done on the example of Rivne region. As the result, the quantity of personnel of scientific organizations has decreased nearly tenfold compared with the data of 2015. The most important is the introduction of innovative products in industrial Rivne region. These enterprises emit the most harmful substances – lead, mercury, nitrogen, carbon dioxide and others.*

Conclusions. *Main conclusions are:*

1. To combine quantitative and qualitative research methods in economics of innovations, e.g. a review of cluster development statistics complemented by a beneficiary survey, as well as beneficiary and stakeholder interviews that can be used to develop case studies, which probe into the quality of cluster interactions in innovation activity;

2. Be participative and ideally draw on the expertise of cluster practitioners, academics and policy makers;

3. Reflect in a realistic budget and timeframe the complexity of an impact evaluation of cluster interventions in terms of methodological design and research economical tools in innovation activity.

Keywords: *innovations; regional strategy; regional programmes.*

УДК 339.138

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РЕГІОНАЛЬНА ІННОВАЦІЙНА ЕКОНОМІКА: АСПЕКТИ ЕКОНОМІЧНОГО РОЗВИТКУ

Актуальність теми дослідження. *Стійке зростання і підвищення рівня життя можуть бути отримані тільки за рахунок збільшення продуктивності і впровадження нових і поліпшених продуктів і послуг, які успішно конкурують на світовому ринку. Це особливо актуально в сфері охорони навколишнього середовища.*

Постановка проблеми. *Вивчення екологічних інновацій в регіонах, знаходження нових способ стимулювання українських компаній щодо реалізації інновацій у регіонах.*

Аналіз останніх досліджень і публікацій. *Інновації як основа економічного розвитку завжди становили інтерес для дослідників (Едісон Н., Алі Н., Торкар Р., Хейне П., Боеттк П., Причітко Д., Струмський Д., Лобо Д.; Тейнтер Д., Гордон Р.) і багато інших.*

Виділення недосліджених частин загальної проблеми. Постановка завдання. *Вчені переважно розглядали класичну теорію інновацій. Але інновації мають регіональні специфікації. Їх слід розглядати окремо для кожного регіону. Метою дослідження є обґрунтування всіх цих характеристик та їх включення до інноваційного процесу.*

Виклад основного матеріалу. *У даній роботі основні аспекти інноваційної діяльності було зроблено на прикладі Рівненської області. Кількість персоналу наукових організацій зменшилася майже в десять разів у порівнянні з даними 2015 г. Найбільш важливим є впровадження інноваційної продукції в промисловому комплексі Рівненській області, оскільки ці підприємства виділяють найбільш шкідливі речовини - свинець, ртуть, азот, вуглекислий газ і інші.*

Висновки. *Запропоновано такі заходи:*

1. Поєднувати кількісні та якісні методи дослідження в економіці інновацій, наприклад огляд статистики розвитку кластера, доповнених опитуваннях вигодонабувача, а також бенефіціарів і зацікавлених сторін, які можуть бути використані для розробки тематичних досліджень, як кластерних взаємодій в інноваційній діяльності;

2. Спиратися на досвід кластерних практиків, науковців та осіб, що визначають політику впровадження інновацій;

3. Відображати реалістичний бюджет і вплив кластерних втручань з точки зору методологічної та науково-дослідних економічних інструментів в інноваційній діяльності.

Ключові слова: *інновації; регіональна стратегія; регіональні програми.*

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Urgency of the research. In modern, competitive economies, knowledge-based innovations are the foundation for economic development. Sustainable growth and improved living standards can only be obtained due to increasing of productivity and introducing new and better products and services that compete successfully in the global market. This is especially actually in the environmental field as industry due to their lack of technical equipment make large emissions of harmful substances into the environment.

Target setting. The purpose of the research is to study environmental innovation in the regions, finding new ways to stimulate the Ukrainian companies of national economy to implement innovation.

Actual scientific researches and issues analysis. Innovations as the cutting edge of economic development are also of increasing interest to researchers. Entire books describe how to manage the innovations of such scientists as Edison H., Ali N. B., Torkar R. (2013), Heyne P., Boettke P. J., Prychitko D. L. (2010), Rubin Tzameret H., Aas Tor Helge, Stead Andrew (2015), West M. A. (2002), Anthony Scott D., Johnson Mark W., Sinfield Joseph V., Altman Elizabeth J. (2008), Strumsky D., Lobo J., Tainter J. A. (2010), Gordon Robert J. (2012) and many others.

Uninvestigated parts of general matters defining. The research objective. All the scientists examined the implementation of the classical theory of innovations. But innovations have a regional specifications. Each region has its own social, economic and environmental performance. They should be considered separately for each region. The purpose of the paper is justification for all these characteristics and their inclusion in the innovation process.

The importance of innovation is recognized in many legal and policy documents, including at the highest level. However, a holistic consideration of the national innovation system, its various components and the relations between them, remains lacking. A narrow interpretation of innovation, which emphasizes technological aspects, prevails. The subsystems of science and innovation intermediaries receive greater policy attention, but there is less emphasis on the need to encourage innovation in the business enterprise subsystem. Now it is necessary to appeal to small and big businesses as an important driver of economic dynamism. There is insufficient consideration of linkages between subsystems, including between the science and business sectors, which are keys for the definition of a science, technology and innovation strategy.

All this led to finding the new ways to stimulate innovation and economic development has been the subject of writing of this scientific article. There have been multiple innovation – related initiatives in Ukraine over recent years, reflecting the continued importance attached to innovation as a driver of growth and competitiveness. However, many of the legal and policy documents remain at a conceptual level, with insufficiently defined practical policy measures or instructions for further implementation. More attention to the appropriate sequencing of different proposed stimulation regions is required.

The statement of basic materials. The effective coordination is one of the main challenges in innovation governance. Despite the progress made by administrative reforms, the responsibilities of key actors are not yet clearly defined. Allocated resources are often not in line with the mandates received. Innovation related activities are distributed across different public organizations but there is not a single coordinating body. While there is vertical coordination (from agencies to ministries and to the government), horizontal coordination mechanisms are weak or missing [1].

In this work the main aspects of innovation activity has been done on the example of Rivne region. The scientific and practical interest has the study of the quality of personnel engaged in innovation. The basic data are given in Tab. 1.

As the result, the quantity of personnel of scientific organizations has decreased nearly tenfold compared with the data of 2015. In return, the quantity of personnel who maintain scientific work pluralistically has increased twice (from 314 persons in 1995 to 709 in 2015 year). The same doubled the number of candidates of sciences for the entire period from 1995 to 2015 (from 170 to 393) in Rivne region.

Table 1

The Scientific Personnel of Scientific Organizations[1-3]

№	Indicator	Years							Absolute deviation (+, -)	Relative deviation, %
		1995	2000	2005	2010	2013	2014	2015		
1	Quantity of personnel of scientific organizations *[1]	1195	693	638	312	257	234	190	-1005	15,9
2	Quantity of personnel who maintain scientific and scientific-technical services	745	508	332	207	203	172	147	-598	19,7
3	Including those who have a degree doctor of sciences	1	4	1	2	5	5	*3	2	300
4	candidate of sciences	27	24	14	19	24	27	*3	-24	11,1
5	Quantity of personnel who maintain scientific work pluralistically *[2]	317	856	1385	1594	1556	1368	709	392	223,7
6	Including those who have a degree doctor of sciences	21	32	50	99	128	107	59	38	280,9
7	candidate of sciences	170	516	537	728	833	739	393	223	231

[1] Since 2010 organizations which maintain only scientific-technical services, don't form reports.
[2] Since 2010 including all the scientific-pedagogical employees of the academies.
[3] Here the data is not published to secure the execution of the Law of Ukraine 'About state statistics' about the confidentiality of data.

Source: calculated by [2]

The data of the extent of scientific and technical work represents the Tab. 2.

Table 2

The extent of scientific and technical work, executed by the organizations (enterprises) their selves, by their kinds

Indicator	In all	Including				Absolute deviation 2015 to 1995 (+, -)	Relative deviation 2015 to 1995, %
		Substantial investigations	Applied investigations	Scientific-technical working out	Scientific-technical services		
1995	1,7	0,3	0,4	0,9	0,1		
2000	5,0	0,3	2,1	1,7	0,9		
2005	9,4	1,1	3,0	3,9	1,4		
2010	11,8	1,7	6,3	2,3	1,5		
2011	12,4	1,7	6,6	2,4	1,7	9,5	658,8
2012	14,9	1,9	7,3	3,4	2,3		
2013	14,3	1,8	7,7	2,6	2,2		
2014	11,7	2,0	7,1	0,8	1,8		
2015	11,2	3,0	4,6	1,7	1,9		

Source: calculated by [2]

How to show all the data in Table 1, the extent of scientific and technical work, executed by the enterprises by their kinds, - absolute deviation from 1995 to 2015 has increased by 9,5 positions, also relative deviation 2015 to 1995 is nearly 659 %. This indicates that the total volume of scientific devel-

opment for the entire study period increased by six and a half times. The distribution of the extent of financing of scientific and technical work, by the financial sources has been given on the Tab. 3.

Table 3

Distribution of the extent of financing of scientific and technical work, by financial sources (in actual prices, mln hrn)

Indicator	Years							Absolute deviation (+, -)	Relative deviation, %
	1995	2000	2005	2010	2013	2014	2015		
In all	2,2	5,1	10,2	12,3	14,4	12,3	11,2	9,0	509,1
At the expense of state budget	0,5	1,3	4,1	7,5	9,1	8,4	7,1	6,6	1420
Proper means	0,3	0,4	2,0	1,9	1,1	1,2	1,6	1,3	533,3
Customer funds of national	1,0	2,6	4,0	2,6	3,5	1,7	1,9	0,9	190
of foreign states	0,3	0,6	0,0	-	0,2	0,5	0,2	-0,1	66,7
Other sources	0,1	0,2	0,1	0,3	0,5	0,5	0,4	0,3	400

Source: calculated by [2]

According to the data Tab. 3, funding for research from the state budget grew steadily throughout the period 1995-2015. Clearly, this was mainly due to inflation in the country. So, overall funding for innovation has increased five times (from 0,5 to 7,1 mln hrn). The spending on innovations from the state budget increased in fourteen times. However, foreign investors have reduced funding. It is in 2015 only 66% of the 1995 level. This trend is because of an undeclared war in Ukraine, financial risks, the instability of the monetary system, the growth of the US dollar and other dangers.

Table 4

The costs of organizations for execution of scientific and technical work by own strength, by their kinds (in factual prices, mln hrn)[1]

Indicator	In all	including				Absolute deviation (+, -)	Relative deviation, %
		Substantial investigations	Applied investigations	Scientific-technical working out	Scientific-technical services		
1995	1,6	0,3	0,4	0,8	0,1	9,6	700
2000	4,8	0,3	2,1	1,5	0,9		
2005	9,3	1,0	3,0	3,7	1,6		
2010	12,2	1,7	6,2	2,3	2,0		
2011	12,8	1,7	6,6	2,8	1,7		
2012	15,0	1,9	7,2	2,7	3,2		
2013	14,4	1,7	7,7	2,2	2,8		
2014	12,3	2,0	7,1	0,8	2,4		
2015	11,2	3,0	4,6	1,7	1,9		

[1] including expences for salary, material costs, other current expences.

Source: calculated by [2]

The costs of organizations for execution of scientific and technical work by own strength, by their kinds also have increased from the period 1995 to 2015 – in absolute terms by 9 mln hrn. it is more than seven times (Tab. 4).

The quantity of personnel of the scientific organizations by personnel categories has been given in the table 5. As the table shows, there is a gradual decrease the number of workers in innovations – from 1995 to 2015 years. This can be explained by low salaries in research.

As a result, the quantity persons of the scientific organizations by personnel categories has significantly reduced in several times. The volume of all types of research decreased five times. The number of technical staff has decreased from 297 to 29 people, or 10 times. Secondary staff has decreased from 204 to 12 people, or in 18 times.

Table 5

Quantity of personnel of the scientific organizations by personnel categories (people)

Indicator	1995	2000	2005	2010	2013	2014	2015	Absolute deviation (+, -)	Relative deviation, %
In all	1195	693	638	312	257	234	190	-1005	15,9
investigators	448	281	250	160	145	130	118	-330	26,3
Technical personnel	297	227	82	47	58	42	29	-268	9,8
Secondary staff	204	108	72	55	23	24	12	-192	5,9
others	246	77	234	50	31	38	31	-215	12,6

Source: calculated by [2]

The quantity of personnel-women in the scientific organizations by educational level has been shown in the Tab. 6.

Table 6

Quantity of personnel-women in the scientific organizations by educational level (people)

Indicator	2013	2014	2015	Absolute deviation (+, -)	Relative deviation, %
In all	145	136	113	-32	77,9
Who have full high education	101	102	86	-15	85.1
Basic high, elemetary high	33	23	19	-14	57,6
other	11	11	8	-3	72,7

Source: calculated by [2]

Over the period from 2013 to 2015 there was a decrease in the employment of women in scientific organizations. The number of women, who have full high education decreased by 15 percent.

The quantity of active in innovations industrial enterprises by types of economic activities has been done in the Tab. 7.

Table 7

Quantity of active innovations industrial enterprises by the types of economic activities[1]

Indicator	2014		2015		Absolute deviation (+, -)	Relative deviation, %
	In all, units	Percentage to general quantity of enterprises by the appropriate type of activities	In all, units	Percentage to general quantity of enterprises by the appropriate type of activities		
1	2	3	4	5	**6**	**7**
industry	45	14,9	13	10,6	-30	28,9
Extractive industry and pit mining	3	13,6	1	7,7	4,7	256,6
Other minerals extracting and pit mining	3	13,6	1	7,7	-2	33,3
Processing industry	40	16,6	12	13,5	-28	30
Food industry	12	18,5	4	14,3	-8	33
Beverage foods production	1	20,0	-	-	-	-
Clothes production	1	7,1	-	-	-	-
Woodworking and wood and cork production except furniture; production of straw and plant materials for netting	5	16,7	1	11,1	-4	25
Typography and replication of the recorded information	1	14,3	-	-	-	-
Chemical industry	2	40,0	-	-	-	-
Production of the main pharmaceutical medicine	1	100,0	1	100,0	-	-

Continuation of Table 7

1	2	3	4	5	**6**	**7**
Production of elastic and plastic goods	2	16,7	1	20,0	-1	50
Production of the other not metallic mineral production	3	10,0	2	18,2	-1	75
Metallurgic production	1	50,0	-	-	-	-
Production of metallic goods except cars and hardware	2	12,5	-	-	-	-
Cars and hardware	2	20,0	2	50,0	-	-
Production of tran-sport modes, trailers	3	100,0	-	-	-	-
Production of furniture	-	-	1	25,0	-	-
Production of other products	1	14,3	-	-	-	-
Repair and mounting of cars and hardware	3	23,1	-	-	-	-
Providing of electricity, gas, steam and conditioned air	1	5,6	-	-	-	-
Water supply: sewe-rage, waste treatment	1	4,5	-	-	-	-

Major trends are the following. The number of all types of development significantly decreased. The quantity of active in innovations industrial enterprises by types of economic activities has decreased by three times (to nearly 29 %). The same situation is in processing industry and food industry. Preferably, the companies recently are not interested to introduce innovations and projects because they are too expensive and have a long payback period.

There are not enterprises that do innovations of metallurgic production, production of metallic goods except cars and hardware, production of transport modes, trailers, water supply (sewerage, waste treatment), providing of electricity, gas, steam and conditioned air, production of metallic goods except cars and hardware. The main key trends of general extent of innovations expenses in industry have been represented on the Tab. 8.

Table 8

General extent of innovations expenses in industry (in factual prices) [1]

Indicator	2010		2013		2014		2015	
	Thousand hrn	Percentage to the general extent	Thousand hrn	Percentage to the general extent	Thousand hrn	Percentage to the general extent	Thousand hrn	Percentage to the general extent
In all	37879,9	100,0	11404,5	100,0	6865,9	100,0	21130,8	100,0
By directions: inner scientific-investigative works	2395,9	6,3	1228,4	10,8	…1	…1	220,6	1,1
Outer scientific-investigative works	…1	…1	-	-	…1	…1	450,0	2,1
Purchasing of cars, imple-ment, software	29296,7	77,3	9061,6	79,5	5062,4	73,7	18402,3	87,1
Purchasing of other outer knowledge	…1	…1	140,2	1,2	-	-	538,5	2,5
other	5243,5	13,8	974,3	8,5	…1	…1	1519,4	7,2

1 Here the data is not published to secure the execution of the Law of Ukraine 'About state statistics' about the confidentiality of data.

Source: calculated by [2]

As the analytical data show, in table 8, in recent years has fallen funding of research. This is a very negative trend of general extent of innovations expenses in industry. The largest share of funding belongs to this trend, as purchasing of cars, implement, software – nearly 90 %.

Table 9

Extent distribution of the financing of innovational activities in the industry (in factual prices) [1]

Indicator	2010		2013		2014		2015		Absolute deviation (+, -)	Relative deviation, %
	Thousand of hrn	Percentage to the general extent	Thousand of hrn	Percentage to the general extent	Thousand of hrn	Percentage to the general extent	Thousand of hrn	Percentage to the general extent		
In all	37879,9	100,0	21130,8	100,0	11404,5	100,0	6865,9	100,0	-31014	18,1
By the epenses of state budget	…1	…1	-	-	-	-	-	-	-	-
Own costs	36036,9	95,1	13517,4	64,0	10826,5	94,9	…1	…1	-	-
Other sources	…1	…1	7613,4	36,0	578,0	5,1	…1	…1	-	-

[1] Here the data is not published to secure the execution of the Law of Ukraine 'About state statistics' about the confidentiality of data.

Source: calculated by [2]

The most important is the introduction of innovative products in industrial Rivne region. These enterprises emit the most harmful substances – lead, mercury, nitrogen, carbon dioxide and others. The data of implementation of new technological processes and development of the production of the new types of products in industry has been done in table 10.

Table 10

Implementation of new technological processes and development of the production of the new types of products in industry[1]

Indicator	2010	2013	2014	2015	Absolute deviation (+, -)	Relative deviation, %
New technological processes implemented	6	19	8	9	3	150
Including less wasting technologies, resources-saving and out-of-wasting	4	3	2	3	-1	75
Development of innovational products, terms	16	18	6	7	-9	43,5
Including new types of technique	8	5	4	…1	-7	12,5

[1] Here the data is not published to secure the execution of the Law of Ukraine 'About state statistics' about the confidentiality of data.

Source: calculated by [2]

As this table shows, the new technological processes implemented with some growth – 50 % in 2015 year compared with 2010 year. Although implementation of less wasting technologies, resources-saving and out-of-wasting has been reduced to 75%, the development of innovational products, terms reduced to 75 %, the new types of technique – 12,%. We can conclude therefore that the whole industry of Rivne region has lost their positions for effective innovation.

The extent of the realized innovational production in Rivne region has been presented in the Tab. 11.

So, the extent of the realized innovational production has been decreased by 11,2 thous. hrn – from 78,6 2 thous. hrn to 67324,4 thous. hrn. Now in 2015 it is 85 % of the size of the data of 1995 level.

An example for Ukraine in implementing innovation is the European Union. The Europe 2020 strategy is the EU's agenda for growth and jobs for the current decade. It emphasises smart, sustainable and inclusive growth as a way to overcome the structural weakness in Europe's economy, to improve its competitiveness and productivity and to underpin a sustainable social market economy. As a general trend, between 2008 and 2014 the employment share in knowledge-intensive activities increased in all Member States (except for Italy, which maintained the same level). Countries where the share increased substantially were Luxembourg and Croatia (5.7 percentage points each), followed by Ireland, Portugal, Estonia, Spain, Cyprus, Malta, Greece, Slovenia, Latvia, Denmark and the Czech Republic. All of these experienced a period of continuous relative growth of 3.0 to 5.0 percentage points [12].

Table 11

Extent of the realized innovational production (in factual prices, thous. of hrn) [1]

Indicator	2010	2013	2014	2015	Absolute deviation (+, -)	Relative deviation, %
In all	78569,4	111857,9	134562,7	67324,7	-11244,7	85,7
What is new for the market	14601,6	12055,0	13254,4	…[1]	-1347,2	90,8
What is new only for industry	63967,8	99802,9	121308,3	…[1]	57340,5	189,6
From general extent put for export	20932,0	24704,5	36021,1	21787,8	855,8	104,1

[1] Here the data is not published to secure the execution of the Law of Ukraine 'About state statistics' about the confidentiality of data.

Source: calculated by [2]

Conclusions. Therefore, as shows the analysis in this paper, the quantity of active in innovations industrial enterprises of Rivne region by types of economic activities has decreased by three times (to nearly 29 %). The same situation is in processing industry and food industry. The whole industry of Rivne region has lost their positions for effective innovation management. This requires developing a package of new measures to stimulate innovation activity. The main of them are:

1. To combine quantitative and qualitative research methods in economics of innovations, e.g. a review of cluster development statistics complemented by a beneficiary survey, as well as beneficiary and stakeholder interviews that can be used to develop case studies, which probe into the quality of cluster interactions in innovation activity;
2. Be participative and ideally draw on the expertise of cluster practitioners, academics and policy makers. Evaluators should ensure that the opinions of the different stakeholder groups, notably business views, are captured and codified;
3. Reflect in a realistic budget and timeframe the complexity of an impact evaluation of cluster interventions in terms of methodological design and research economical tools in innovation activity. All these measures will significantly improve the environmental situation in Ukraine.
4. Innovation Union is the European Union strategy to create an innovation-friendly environment that makes it easier for great ideas to be turned into products and services that will bring our economy growth and jobs.

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