"Analysis of the degree of innovative labor activization of the employed population of Ukraine"

AUTHORS	Nataliia Gavkalova (iD) https://orcid.org/0000-0003-1208-9607
	R http://www.researcherid.com/rid/U-6771-2017
	Alona Zolenko (iD) https://orcid.org/0000-0002-2599-2830
	R http://www.researcherid.com/rid/Y-8729-2019

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KhNUE
Simon Kuznets

S. KUZNETS KHNUE

Nataliia Gavkalova, Professor,
Head of Department, Faculty of
Economics and Law, Department
of Public Administration and
Regional Economy, Simon Kuznets
Kharkiv National University of
Economics, Ukraine

Alona Zolenko, Ph.D. in
Economics, lecturer, Faculty of
Economics and Law, Department
of Public Administration and
Regional Economy, Simon Kuznets
Kharkiv National University of
Economics, Ukraine

Nataliia Gavkalova (Ukraine), **Alona Zolenko** (Ukraine)

ANALYSIS OF THE DEGREE OF INNOVATIVE LABOR ACTIVIZATION OF THE EMPLOYED POPULATION OF UKRAINE

Abstract

The activization of innovative labor of the employed population is an important prerequisite for socio-economic development in Ukraine. In the context of high IT penetration and intellectualization of Ukraine's economy, this innovative type of employment will contribute not only to the realization of the population creative and intellectual potential, but also to the improvement of human capital quality. Therefore, the purpose of this article is to develop a methodical approach to determine the degree of activization of the employed population innovative labor. With this aim in mind, a set of methods was used in the research, such as analysis and synthesis, logical generalization and comparison, taxonomic analysis and formalization. The peculiarity of the developed methodical approach is the ability: to evaluate the initial indicators in a certain time period; to group them into partial indicators reflecting the status and features of innovative work of the employed population at the regional level; to analyze the level of partial indicators with the determination of average values in time and regional aspects; to determine the level of the integral indicator. This will allow, on the one hand, making more structured analysis, and on the other, conducting comprehensive analysis of causes of dynamics for both innovative labor and its components.

Н.Л. Гавкалова (Україна), **А.С. Золенко** (Україна)

АНАЛІЗ СТУПЕНЮ АКТИВІЗАЦІЇ ІННОВАЦІЙНОЇ ПРАЦІ ЗАЙНЯТОГО НАСЕЛЕННЯ УКРАЇНИ

Анотація

Важливою передумовою соціально-економічного розвитку в Україні є активізація інноваційної праці зайнятого населення. В умовах високої інформатизації та інтелектуалізації економіки саме інноваційний тип зайнятості, який є більш гнучким, ефективним та динамічним, сприятиме не тільки реалізації творчого та інтелектуального потенціалу населення, але й підвищенню якості людського капіталу країни. Отже, метою даної роботи є розробка методичного підходу до визначення ступеню активізації інноваційної праці зайнятого населення. Для досягнення зазначеною мети у роботі використано сукупність методів, серед яких: аналіз і синтез, логічне узагальнення та порівняння, таксономічний аналіз, метод формалізації. Особливістю розробленого методичного підходу до визначення ступеня активізації інноваційної праці зайнятого населення, є можливість: оцінити первісні показники в певному часовому періоді; згрупувати їх до часткових індикаторів, що відображають стан та особливості інноваційної праці зайнятого населення в регіональному зрізі; проаналізувати в часовому та регіональному аспектах рівні часткових індикаторів із визначенням середніх величин; визначити рівень інтегрального показника. Це дозволить, з одного боку, більш структуровано, а з іншого – всебічно, діагностувати причини динаміки як інноваційної праці, так і її складових.

INTRODUCTION

The competitive advantages of both an individual employee and an enterprise, and the state as a whole in the modern globalized world use new innovative technologies, finding creative solutions to standard problems, anticipating the high demands of consumers, which make it advisable to accompany the work with innovations. It is the innovative direction of development that is based on the active use of knowledge and scientific achievements, stimulation of innovation activity, which is decisive in the strategy for the sustainable development of Ukraine till 2030. In turn, the prerequisite for the introduction of innovative transformations in Ukraine towards sustainable development is the Association Agreement between Ukraine and the European Union. Therefore, the formation of an innovative model Ukraine's economy involves the transformation of ideas about the content of work and the role of human resources in ensuring sustainable development and increasing the competitiveness of national economy. Under these conditions, the innovative labor of the employed population, which is distinguished by its intellectual component, professionalism and creativity, is of a particular importance. At the same time, an important problem of ensuring the functioning of the employed population innovative labor management system is a comprehensive analysis of the impact of the factors of micro and macro environment on the innovation labor and, accordingly, determining the degree of its activation.

1. LITERATURE REVIEW

The theoretical and methodological aspects of productivity growth, the intellectualization of labor force and the peculiarities of its increase under the conditions of innovative model development are sufficiently researched and covered in scientific literature. Thus, in the research by Sankova (2008) the methodology of estimation of innovative type employment which is presented in construction of the integral indicator on the basis of a system of indicators and allows to link technical-informational, socio-economic, institutional and socio-cultural factors, the state of employment with criteria of innovation at different levels of economy are proposed. The uniqueness of this approach is the use of an indicator of employment "innovative elasticity", which is calculated on the average wage in innovative industries and on investments in fixed capital.

Other famous scientists such as Semykina and Pasjeka, (2012) have focused on a qualitative assessment of the performance and the complexity of innovation units (teams) work, which allow to use the appropriate incentive model. This approach will help to solve the problem of intensifying the innovative labor of staff, which requires overcoming the contradictions that exist in the assessment of efficiency and complexity of work, establishing a link between an income and work results.

An interesting article by Chernoivanova (2018) describes the conceptual provisions for evaluating the innovative activity at an enterprise. This approach allows to: 1) identify the micro-environmental factors that influence the innovation activity of enterprises and put them in accordance with statistical indicators that allow the evaluation; 2) evaluate the innovative activity of modern Ukrainian enterprises in order to identify the negative tendencies, directions and priorities of innovative development.

According to Goffin and Mitchell (2010) "Innovation Management" flexibility, adaptability of innovation structures and their ability to learn are the factors that determine the degree of their innovation. In turn, adaptability as an essential feature of an organization is provided by purposeful employee training.

De Jong and den Harto (2010) in the article "Measuring Innovative Work Behaviour" emphasize the importance of innovative work behavior (IWB) of individual employees for organizational success, but they note, that the measurement of employees' IWB is still in evolution. The most used data collection methods include interviews with a variety of participants, observation methods and document analyses.

Thus, the complexity of assessing the innovative labor of the employed population is that the final result of the employment system at the national, regional and corporate levels is at the same time the result of the existing innovation climate, the state of the workplace system, purposeful investment, organization of production process and the personality of an employee, his natural properties and abilities. In addition, a sufficient number of indicators for assessing the innovation potential of the employment system are poorly formalized and difficult to quantify.

2. AIMS

With the transformation of the content of labor and the transition of the economy to a new level of development, there is an urgent need to find ways to activate the innovative labor of employed population and to justify the tools for its evaluation. Therefore, developing the ideas of existing approaches and eliminating their main shortcomings, the purpose of this article is to justify a methodical approach to determining the degree of activization of innovative labor of Ukraine's employed population. To achieve this goal it is necessary to perform the following tasks: to define the main groups of indicators for evaluation of population innovative labor; to develop a methodological approach to determine the degree of activization of employed population innovative labor; to present the results of implementation of the proposed methodological approach.

3. METHODS

To achieve this goal, the following research methods were used in the research: analysis and synthesis, logical generalization and comparison – to analyze approaches to the evaluation of innovative labor; formalization method – to justify the steps of methodological approach; taxonomic analysis – to calculate the integrated indicators for assessing the level of activization of employed population innovative labor.

4. RESULTS

The employment of population based on personal labor provides an income and determines the preconditions for the effective use of labor potential of the state, the region and the individual employee and is related to ensuring the scope, conditions and forms of innovative labor inclusion in social work. Employment indicates the level of provision of working population with jobs in the system of social work relations. Taking into account the whole spectrum of relations that manifest themselves and intersect in the content of the category "employment of population", in the opinion of Kremen (2010), it synthesizes the system of economic, legal, social, national and other relations concerning the activity of citizens in the process of creating a social product in the system of social work based on personal work and income generation.

Thus, the activization of innovative labor of employed population is the prerogative of meso- and macro-level research, which provides for the diagnosis of socio-economic conditions for its functioning. These processes should be considered in close relation to the financial, economic, political, legislative and regulatory aspects that characterize country's economy. Therefore, it is proposed to diagnose the activization of innovative activity of employed population in close connection with the scientific and innovative activity in Ukraine, which reflects the results of labor activity under the influence of various factors.

Taking into account the multidimensionality of innovative labor of employed population, the following components were distinguished, reflecting the scientific and innovative activity in the country:

- indicators of scientific training reflect the status and tendencies of scientific training in scientific and educational institutions;
- indicators of employment of scientific personnel determine the extent to which scientific personnel is involved in the country's economy to carry out researches in terms of scientific degrees;
- indicators of scientific activity financing that determine the amount of expenditures and implementation of

scientific and technical works;
- indicators of scientific activity effectiveness that indicate the practical implementation of scientific achievements;
- indicators of Ukraine's international cooperation in the field of scientific and technical activities that reflect the extent to which the country has close relations with other countries of the world, the practice of technology transfer;
- indicators of industrial enterprises innovation activity that reflect practical aspects of scientific activity;
- indicators of innovative work performance, i.e. legal registration of scientific and practical activity results in the form of intellectual property rights, innovative proposals, utility models, etc.

Insufficient complexity and integrity of research in methodological approaches led to the urgency of extending the boundaries of the study to apply the principles of integrated evaluation. Since the components of the activization of employed population innovative labor are quantitatively reflected through a system of partial indicators (Figure 1), the use of the integrated indicator of the activization of employed population innovative labor will allow, on the one hand, more structured, and on the other hand, comprehensive analysis of the causes of dynamics of both an activity of innovative labor and its components.
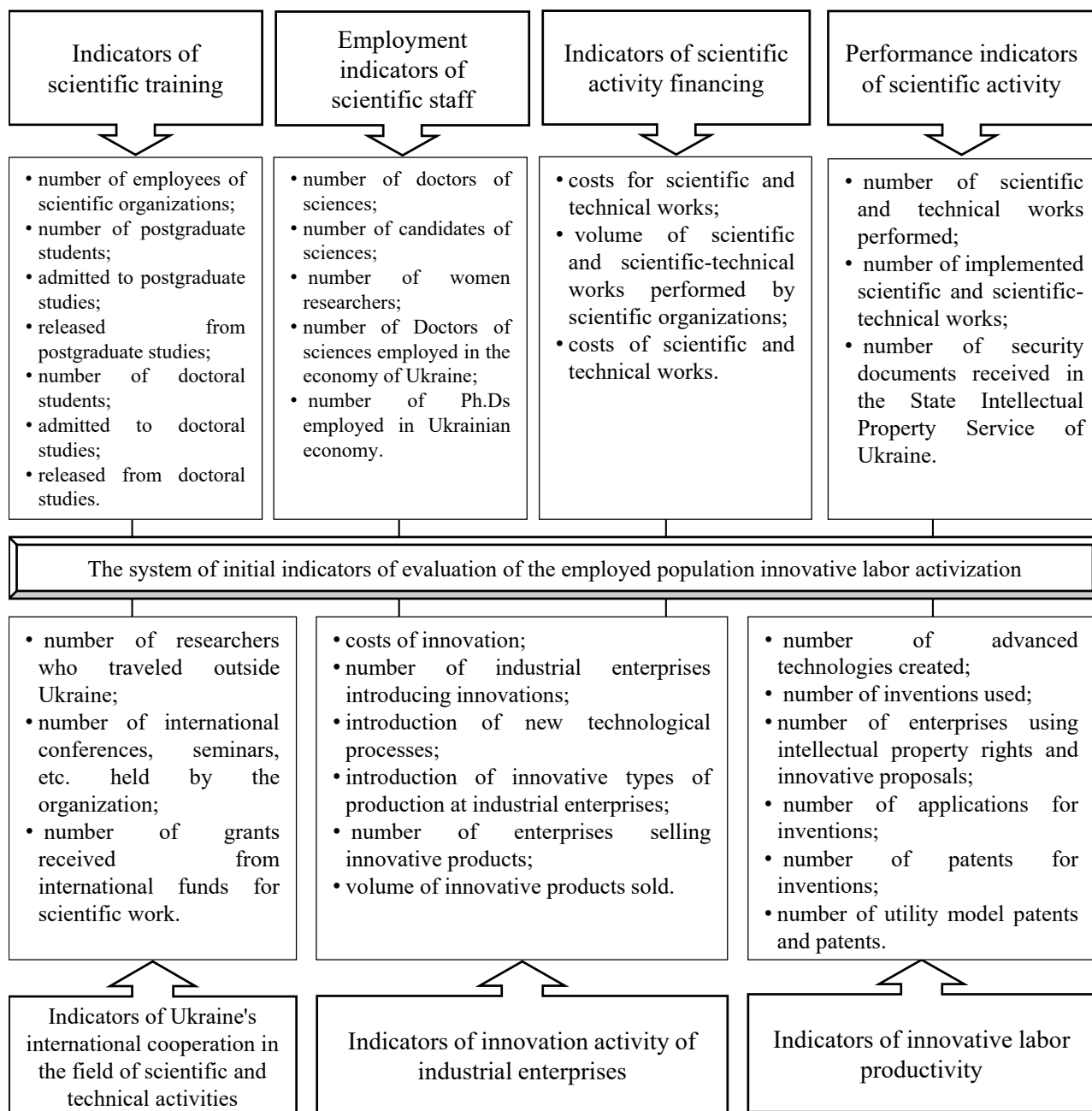
Therefore, the peculiarity of the proposed methodological approach to determine the degree of activization of employed population innovative labor is the ability to: evaluate the initial indicators in a certain time period; group them into partial indicators reflecting the status and features of employed population innovative labor at a regional level; analyze the level of partial indicators with determination of average values in time and regional aspects; determine the level of integral indicator that will allow to formulate practical recommendations in the context of improving the organizational and economic support of employed population innovative labor.

Consistent implementation of the developed methodological approach to determine the degree of activization of employed population innovative labor includes: formation of a system of indicators reflecting the processes of activization of employed population of innovative labor; standardization of values of the proposed indicators in order to obtain a unified dimension; justification of stimulant and destimulant indicators and standard indicator; calculation of the integral indicator of the level of activization of employed population innovative labor.

It should be noted that the main source of information for the integrated evaluation is the statistics of the State Statistics Committee of Ukraine, and the whole set of proposed indicators are stimulants, which simplify the procedure of calculating the integral index in Microsoft Excel. The quantitative value of the integral indicator of activization of employed population innovative labor will be distributed according to the Harrington scale and will be estimated in the range from 0 to 1.

Thus, the implementation of this methodological approach to determine the activization of innovative labor of employed population using taxonomic analysis made it possible to obtain the values of partial and integral indicators (Table 1).

The dynamics of the average regional level of integral indicator of the degree of activization of employed population innovative labor in Ukraine (Figure 2) allows us to generalize the results obtained. The construction of a polynomial trend allows us to describe the values of time series, which are increasing and decreasing.

Indicators of scientific training	Employment indicators of scientific staff	Indicators of scientific activity financing	Performance indicators of scientific activity
• number of employees of scientific organizations; • number of postgraduate students; • admitted to postgraduate studies; • released from postgraduate studies; • number of doctoral students; • admitted to doctoral studies; • released from doctoral studies.	• number of doctors of sciences; • number of candidates of sciences; • number of women researchers; • number of Doctors of sciences employed in the economy of Ukraine; • number of Ph.Ds employed in Ukrainian economy.	• costs for scientific and technical works; • volume of scientific and scientific-technical works performed by scientific organizations; • costs of scientific and technical works.	• number of scientific and technical works performed; • number of implemented scientific and scientific-technical works; • number of security documents received in the State Intellectual Property Service of Ukraine.

The system of initial indicators of evaluation of the employed population innovative labor activization

• number of researchers who traveled outside Ukraine; • number of international conferences, seminars, etc. held by the organization; • number of grants received from international funds for scientific work.	• costs of innovation; • number of industrial enterprises introducing innovations; • introduction of new technological processes; • introduction of innovative types of production at industrial enterprises; • number of enterprises selling innovative products; • volume of innovative products sold.	• number of advanced technologies created; • number of inventions used; • number of enterprises using intellectual property rights and innovative proposals; • number of applications for inventions; • number of patents for inventions; • number of utility model patents and patents.
Indicators of Ukraine's international cooperation in the field of scientific and technical activities	Indicators of innovation activity of industrial enterprises	Indicators of innovative labor productivity

Source: Author's development.

Figure 1. The system of initial indicators of evaluation of the employed population innovative labor activization

Table 1. Analysis of the level of the integral indicator of activation of the employed population innovative labor in the regions of Ukraine by years
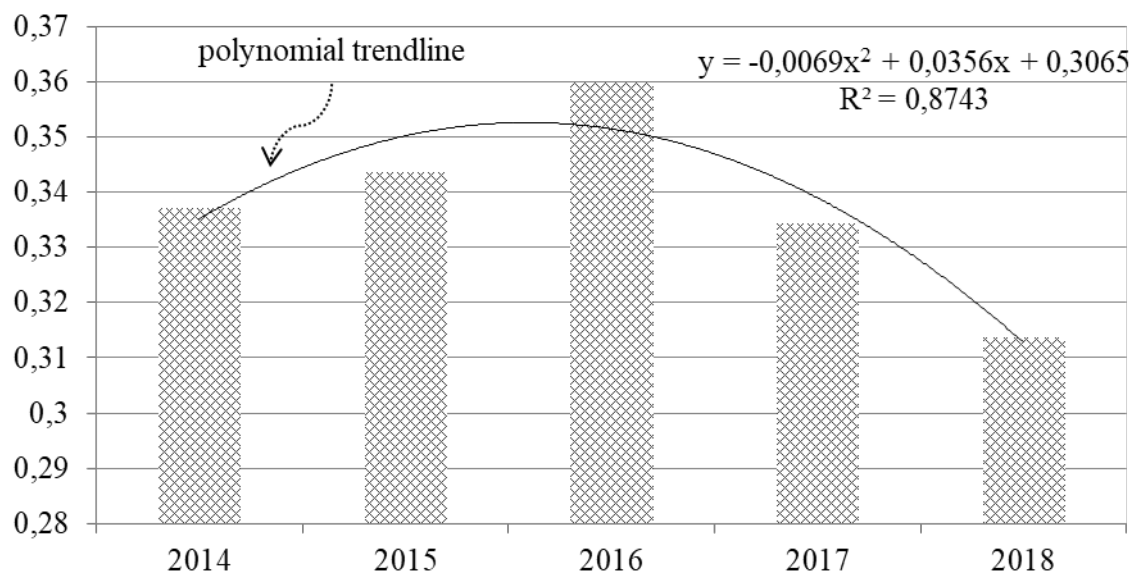
Source: Author's development.

Region	2014	2015	2016	2017	2018	The average over the period
Vinnytsia	0.509	0.535	0.591	0.545	0.456	0.527
Volyn	0.205	0.215	0.225	0.206	0.195	0.209
Dnipro	0.645	0.617	0.68	0.625	0.581	0.630
Donetsk	0.264	0.268	0.276	0.247	0.229	0.257
Zhytomyr	0.219	0.228	0.229	0.231	0.207	0.223
Zakarpattia	0.247	0.241	0.253	0.235	0.227	0.241
Zaporizhzhia	0.402	0.413	0.426	0.431	0.365	0.407

Table 1 (cont.).

Ivano-Frankivsk	0.268	0.283	0.33	0.269	0.252	0.280
Kyiv	0.345	0.339	0.364	0.335	0.435	0.364
Kirovohrad	0.213	0.216	0.22	0.205	0.195	0.210
Luhansk	0.307	0.345	0.341	0.318	0.294	0.321
Lviv	0.529	0.582	0.559	0.51	0.468	0.530
Mykolaiv	0.301	0.306	0.355	0.31	0.268	0.308
Odesa	0.489	0.461	0.555	0.452	0.414	0.474
Poltava	0.268	0.306	0.29	0.321	0.319	0.301
Rivne	0.205	0.2	0.213	0.199	0.183	0.200
Sumy	0.378	0.297	0.308	0.315	0.295	0.319
Ternopil	0.219	0.222	0.228	0.226	0.221	0.223
Kharkiv	0.882	0.946	0.952	0.909	0.868	0.911
Kherson	0.248	0.235	0.25	0.248	0.218	0.240
Khmelnytskyi	0.233	0.252	0.251	0.222	0.194	0.230
Cherkasy	0.248	0.263	0.263	0.225	0.21	0.242
Chernivtsi	0.238	0.249	0.258	0.231	0.213	0.238
Chernihiv	0.228	0.228	0.22	0.209	0.222	0.221
Average by region	0.337	0.344	0.360	0.334	0.314	

Analysis of the activization of employed population innovative labor allows to draw the following conclusions: more often in the regions indicators of training and employment of scientific personnel are in dissonance, which testifies to the imbalance of scientists market; most regions of Ukraine have very high levels of funding of scientific activity, which is explained by the almost equal values of original indicators; the effectiveness of scientific activity in the region depends entirely on the density of location of scientific and educational institutions, the level of industrial development, the level of scientific schools development, the degree of development funding; the indicator of international cooperation in the field of science and technology which is of medium or high importance mainly in border regions, with respect to the central part – they have the potential to improve their values; indicators such as innovation and performance of innovative labor should essentially correlate with each other, but only in case when innovation is effective. If we trace the interdependence of the levels of these indicators, they are generally unbalanced.

Source: Author's development.

Figure 2. Dynamics of the average regional level of the integral indicator of the degree of activization of the employed population innovative labor in Ukraine

Consequently, it is clear from the research that one of the priorities for innovative development of economy should be the increase of productivity of employed population, which will help to provide high levels of value added, income and investment, stimulating human development and formation of high social standards. At the same time, the current state of social-labor and industrial sphere is characterized by the presence of significant obstacles to the realization of labor productivity and innovative activity reserves growth.

CONCLUSION

The article proposes to diagnose the activization of employed population innovative activity in close connection with the scientific and innovative activity in Ukraine, which reflects the results of labor activity under the influence of various factors. At the same time diagnostics involves carrying out the analysis on such seven components as indicators of scientific personnel training, employment of scientific personnel, financing of scientific activity, efficiency of scientific activity, innovative activity of industrial enterprises and efficiency of innovative labor, international cooperation of Ukraine in the field of scientific and technical innovations. Insufficient complexity and integrity of the research in the field of methodological approaches led to the relevance of extending the boundaries to the application of the principles of integrated assessment based on the taxonomy method. Since the components of activization of employed population innovative labor are quantitatively reflected through a system of partial indicators, the application of the integral indicator of the activization of employed population innovative labor which will allow to analyse more dynamically and comprehensively the causes of dynamics of both the activity of innovative labor and its components.

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