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ORGANIZATIONAL AND INNOVATION MANAGEMENT OF FINANCIAL AND PERSONNEL SUPPORT FOR THE INTELLECTUAL POTENTIAL OF HIGHER EDUCATION INSTITUTIONS

ABSTRACT

At this historical stage of development, Ukraine is going through the most difficult times since the period of gaining its independence. The logic of state administration, financial and credit relations, social guidelines and the foreign policy of our country in general has changed. The sectors of education and science, in which not always positive changes are taking place, were also affected by such changes. Rather, on the contrary, there is a trend of stagnation in education caused by weak institutional support, and imperfect personnel and financial policies. The aggressive policy of the Russian Federation in relation to our country caused a powerful surge of internal and external migration of the population, including highly professional and narrowly qualified workers who were involved in educational and scientific processes and proved their effectiveness. In such conditions, it becomes necessary to determine the orientations of the organizational and innovative management of financial and personnel support of academies, institutes, universities and other educational institutions in the conditions of the restoration of intellectual potential. It is especially important to develop a methodology for its assessment and forecasting. In this context, the article proposes ways of evaluating, forecasting and improving the organizational and innovative management of financial and personnel support of higher education institutions. In the process of writing the article, economic and mathematical methods, tools and models were used, in particular two-factor regression models, Farrar-Glober tools, the method of least squares, and Fisher's F-criterion analysis. Taking into account the trends of forecasting financial and personnel support in order to improve the management of higher education institutions, managers should pay attention to the need to attract investments to improve the quality of scientific research.

Keywords: management, financial and personnel support, intellectual resources, institutions of higher education, cluster partnership, scientific research and development, forecasting, socio-economic development

JEL Classification: I22, O15

INTRODUCTION

Management of higher education institutions is a complex task that involves various aspects such as administrative management, financial planning, personnel policy, cluster partnership development, public relations and many others. Taking into account the unstable external environment, the management of academies, institutes, universities and other educational institutions faces the task of developing a set of adaptive management solutions for effective management of financial and personnel support. The specified directions of management are particularly important because labour resources are the main engine of the development of national education. Financial support helps to implement both the most ambitious plans for the reorganization and restoration of education and to maintain the effective current state of development of educational institutions. Effective management of higher education requires a combination of administrative skills, strategic thinking, ethics, and flexibility to adapt to changes in the educational environment. Ukraine strives to follow European standards, but their implementation is not possible without intellectual capital and financial resources. The issue

of restoring intellectual potential in institutions of higher education is especially important. Intellectual potential is a key element in the development of a highly efficient society and the success of the formation of an entrepreneurial environment. Such potential stimulates scientific research and, the development of new technologies and innovations in institutions of higher education. A highly qualified, able-bodied workforce, which is involved in the educational environment, has the highest ability to solve complex tasks, contributing to economic development and a general increase in the standard of living. The ability to develop and use intellectual potential in the field of education is the key to solving global problems such as climate change, medical pandemics and social inequality. Taking into account the above, there is a need to develop an effective model of organizational and innovative management of financial and personnel support of institutions of higher education in conditions of restoration of intellectual potential. Such a model is able to change the logic of management of higher education institutions and restore labour resources that will improve the quality of life, develop the national economy, and increase the competitiveness of domestic education.

LITERATURE REVIEW

Organizational and innovative management of financial and personnel support of institutions of higher education in conditions of restoration of intellectual potential is not sufficiently analyzed in scientific sources by domestic and foreign scientists. There are numerous scientific works dedicated to the problems of management of higher education institutions in general or specific directions. A scientific article (Shkoda et al., 2023) offered modeling of the efficiency of technological cluster management innovations in the education system, personnel development and material and technical support of implementation potential in post-war recovery.

The researchers proposed a system of factors that must be taken into account when evaluating the labour productivity indicator (Kornieieva et al., 2022). Research on the challenges of managing higher education in times of crisis is particularly important, helping us to understand key aspects of improving education in times of instability (Netswera et al., 2023). In a scientific study (Ovcharenko et al., 2022), directions for the formation of eco clusters are proposed, and the logic and methodology of spatial organization modelling should be used when planning cluster interactions of higher education institutions for the exchange of human and financial resources in the context of crises and unstable institutional development of the country. Researchers (Popkova et al., 2023) focused attention on the problems of higher education development and, the deterioration of social inequality in the context of the fifth industrial revolution.

Similar research can be found in – Higher Education and the COVID-19 Pandemic: Cross-National Perspectives on the Challenges and Management of Higher Education in Times of Crisis. Of particular interest are the works of scientists (Netswera et al., 2023; Kasych et al., 2019), which depict innovative tools for the study of socio-economic phenomena that can be adapted within the framework of our research. The authors (Zhyvko et al., 2022; Kuznetsova et al., 2020) propose managerial principles of financial accounting that can be adapted to evaluate the financial performance of higher education institutions. Significant scientific discoveries can be found in the work (Bakhmat et al., 2022), which describes in detail the management principles of regulating the quality of higher education in conditions of sustainable development. The authors paid special attention to the need to improve the provision of education as a necessary condition for the socio-economic development of the country and increase the competitiveness of higher education.

The scientific work (Kasych et al., 2021) rightly noted the need to stimulate the development of intellectual capital as a necessary factor in the development of any institution, organization or enterprise. The management tools of the pedagogical and sports educational institutions of Ukraine are described in detail in the work (Kubitskyi et al., 2022). Scientists have described in detail the innovative tools that should be used in education to increase the effectiveness of intellectual potential. Taking into account the fact that the methodology, tools and principles of the formation of organizational and innovative management of financial and personnel support by institutions of higher education in conditions of restoration of intellectual potential, in our view, should be studied from the standpoint of an interdisciplinary approach, it is advisable to pay attention to the work (Saienko et al., 2023). In particular, the authors proposed a synergy of bioinformatics methods, the use of which is currently beginning to be implemented in the modelling of complex socio-economic phenomena and the planning of effective educational projects.

Important approaches to evaluating the quality of educational processes are depicted in the work (Oseredchuk et al., 2022; Onopriienko et al., 2023), where the authors pay special attention to the need to improve intellectual potential in the process of distance education. The authors (Gryshko et al., 2018) highlight the key aspects of improving logistics processes in the information system, which can be adapted to educational projects and communications between business, entrepreneurs and authorities. Scientists (Jacob and Gokbel, 2018) determine the need to research optimal models of

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learning outcomes and higher education financing models that can reduce or at least help level the negative trends of the external environment in which the education market functions.

In a scientific article (Mendoza et al., 2019), for the first time, a comprehensive study was presented in which they substantiated how higher education institutions can use a step-by-step approach focused on building a business case and implementing a cyclical economy using the example of the University of Manchester. Scientists (Voznyuk et al., 2021) determine the need to use multimedia educational tools to improve the quality of teaching certain disciplines, which will contribute to increasing the quality of intellectual potential. The study (Secundo et al., 2020) is of interest, which reflects the key role of intellectual capital in the sustainable development of entrepreneurship, the knowledge economy, and quality education. A scientific study (Kuznyetsova et al., 2017; Khodakivska et al., 2022) proposed innovative management concepts to support the security of the economy, which can be adapted within the framework of our scientific analysis. The works (Clarysse et al., 2011; Abualoush et al., 2018; Furman et al., 2023) rightly emphasize the development of academic entrepreneurship, intellectual resources, and development of staff motivation for the sustainable development of the economy.

The conceptual principles of organizational and managerial design of financial and human resources are specified by the authors (Popovychenko et al., 2023). Despite the fact that the authors proposed means of managing financial and personnel resources in agribusiness, some guidelines can be used in our research. In the work (Vasylchak et al., 2022), from the standpoint of management aspects, the main directions of increasing employment of the population are clarified, which will contribute to the improvement of the quality of the market of education and business services. Stimulation of higher environmental education is quite thoroughly reflected in the work (Foo, 2013), which is especially important considering the need for resource conservation and greening of production.

Scientists (Kyryliuk et al., 2021) detailed the organizational and economic drivers, which can be adapted for our research from the standpoint of an interdisciplinary approach. In scientific works (Fatkullina et al., 2015; Wei et al., 2023) the key problems of higher education and improvement of intellectual capital are reflected, and directions for the formation of the concept of ensuring the sustainable development of the education market and labour resources are proposed. Scientists (Bilan et al., 2017; Romanusha et al., 2022) used a system of indicators for the design of effective resource management, the adaptation of modelling tools is appropriate for evaluating the effectiveness of higher education institutions in the knowledge economy.

The problem of using artificial intelligence in complex socio-economic systems is proposed in the article (Sova et al., 2023). The authors identified the relationship between artificial intelligence and digital human resources management, and their impact on sustainable development. It is advisable to use similar means of resource management to improve the efficiency of higher education institutions. The works (Pysarenko et al., 2020; Furman et al., 2023) propose a system for diagnosing economic indicators and business processes, as well as methods for forecasting complex phenomena, which can be useful for accounting for the intellectual potential of higher education institutions. Of great interest is the analysis of social mobility, inequality and the role of higher education in modern conditions. Of great interest is the analysis of social mobility, inequality and the role of higher education in modern conditions (Popkova et al., 2023). In scientific work (Krasnostanova et al., 2021) the essence of human capital as an object of management in the management strategy of innovative development of the region is determined.

The scientific concepts, models and author's hypotheses reviewed by us testify to the close attention of foreign and domestic scientists to the problems of the formation of effective intellectual capital in institutions of higher education, the need for financial, investment and resource management of education. However, in the scientific world, there are no effective methods of organizational and innovative management of financial and personnel support of institutions of higher education in conditions of restoration of intellectual potential.

AIMS AND OBJECTIVES

The purpose of the scientific research is to develop a system of monitoring, diagnosis and evaluation of organizational and innovative management of financial and personnel support of educational institutions. In accordance with the goal, the following tasks were set and solved:

- the problems of managing the financial and personnel support of educational institutions were considered;
- the need to improve the efficiency of intellectual potential in institutions of higher education has been clarified;
- the tools, methods and principles of evaluation of organizational and innovative management of financial and personnel support of educational institutions are determined;

- methods of forecasting organizational and innovative management of financial and personnel support of educational institutions are proposed;
- the problems and directions of increasing the efficiency of organizational and innovative management of financial and personnel support of academies, institutes, universities and other educational institutions in the conditions of intellectual potential restoration are specified.

METHODS

The current state of development of academies, institutes, universities and other educational institutions proves the importance of the reproduction of intellectual potential, especially in the conditions of the need to form an innovative society. This reproduction includes both quantitative and qualitative renewal (extensive or intensive) increasing the level of human resource competencies. The extensive approach refers to the expansion of quantitative characteristics of intellectual potential. This may include increasing the number of students, teachers, researchers, etc. To do this, it is possible to contribute to the increase of funding, the expansion of educational institutes and investment resources. The intensive approach, on the other hand, is aimed at improving quality characteristics in the market of educational services. There is a need to improve key competencies such as leadership, responsibility, communication, honesty, creativity, nobility, dedication and critical thinking, which are important for successful adaptation to the modern labour market in the field of education. This may include the development of new disciplines, scientific programs and learning tools aimed at developing competencies among stakeholders in the education market. The simultaneous implementation of intensive and extensive approaches can contribute to the creation of an effective system of higher education that meets the requirements of a rank-based economy. This, in turn, will contribute to the diffusion of innovations in the education market and will improve the intensification of the process of implementing the strategy of socio-economic development of Ukraine in the conditions of post-war recovery. It was these tasks that motivated us to develop the methodology and methodology of organizational and innovative management of financial and personnel support of academies, institutes, universities and other educational institutions under the conditions of restoration of intellectual potential. In our research, we will use economic-mathematical methods, tools and models, including two-factor regression models, Farrar-Glober tools, the least squares method, and Fisher's F-test analysis. The specified modelling will allow to research, analyze, model and forecast the main influencing factors on the effective indicator of management of financial and personnel support of educational institutions.

In regression modelling, we take into account that the organizational and innovative management of financial and personnel support of academies, institutes, universities and other educational institutions is influenced by not one, but several factors. In this case, the multifactorial correlation-regression analysis used by us will make it possible to determine the degree of contribution of each factor to the integral or effective indicator. In our study, we will conduct a statistical analysis of the impact of the number of educational institutions and the number of employees who perform intellectual and scientific work according to a scientific degree on the level of expenses for performing intellectual and scientific work, as an effective indicator of the recovery of the intellectual potential of Ukraine over the last ten years.

A two-factor linear production function in general describes dependencies in terms of scientific degrees and is described by a production function of the type:

$$\hat{Y} = a_0 + a_1X_1 + a_2X_{21} \quad (1)$$

$$\hat{Y} = a_0 + a_1X_1 + a_2X_{22} \quad (2)$$

$$\hat{Y} = a_0 + a_1X_1 + a_2X_{23} \quad (3)$$

Such a relationship can help determine how segmentation and the number of scientific degrees affect the scientific productivity of higher education institutions, research institutions, or scientific circles. Next, we define the dependent (Y) and independent variables (X):

- dummy factor, X_0 – independent variable, is always taken into account when modelling production linear regression;
- the total number of academies, institutes, universities and other educational institutions, unit, X_1 – independent variable, factor characteristic;
- the volume of scientific workers who perform intellectual and scientific work - total, persons, X_2 – independent variable, factor characteristic;

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- the number of doctors of science involved in the performance of intellectual and scientific work, persons, X_{21} – independent variable, factor characteristic;
- number of doctors of philosophy (candidates of sciences) who perform intellectual and scientific work of individuals, X_{22} – independent variable, factor characteristic;
- number of post-graduate students who perform intellectual and scientific work of persons, X_{23} – independent variable, factor characteristic;
- financing of scientific and intellectual works - total, UAH million, Y is a dependent variable, a result indicator.

The selected period of research of factors and indicators is ten years (2013-2022). For analysis, modelling, realism, forecasting and confirmation of scientific opinion, it is considered that the larger the array of research, the more accurate and realistic the research and econometric analysis (Table 1).

Table 1. Dynamics of the main factors and indicators of organizational and innovative management of financial and personnel support of academies, institutes, universities and other educational institutions for the study of the two-factor linear production model, 2013-2022. *(Source: summarized by the authors using an information resource https://www.ukrstat.gov.ua/)*

Years	Dummy factor, X0	Educational institutions, units, X1	The amount of scientific workers who perform intellectual and scientific work - total, persons, X2				Financing of scientific and intellectual works - everything, UAH million, Y
			Total, persons, X2	of them:			
				doctors of science, persons, X21	doctors of philosophy (candidates of sciences), persons, X22	graduate students, individuals, X23	
2013	1	349	155386	11155	41196	31482	10248.50
2014	1	288	136123	9983	37082	27622	9487.50
2015	1	287	122504	9571	32849	28487	11003.60
2016	1	289	97912	7091	20208	25963	11530.70
2017	1	282	94274	6942	19219	24786	13379.30
2018	1	281	88128	7043	18806	22829	16773.70
2019	1	515	79262	6526	16929	25245	17254.60
2020	1	515	78860	7060	17949	25668	17022.40
2021	1	386	78909	7096	18104	26721	16259.20
2022	1	386	79154	7106	18554	27747	15236.90

At the next stages, within the limits of the proposed research methods, calculations are carried out with the help of electronic spreadsheets "Microsoft Excel", the statistical package "Statistica", built-in statistical, mathematical functions, and arrays.

RESULTS

At the first stage of modelling the organizational and innovative management of financial and personnel support of institutions of higher education in conditions of restoration of intellectual potential, we take into account the algorithm of the Farrar-Glober method for checking multicollinearity. In our study of the general multicollinearity of the factor matrix of the number of academies, institutes, universities and other educational institutions X_1 and the number of employees involved in the performance of intellectual and scientific works, X_2 does not exist. At the same time, there is a general multicollinearity of the matrix of factors X_{21}, X_{22}, X_{23}: the number of doctors of science involved in intellectual and scientific work; the number of doctors of philosophy (candidates of sciences) who perform intellectual and scientific work; the number of graduate students who perform intellectual and scientific work. In our case, in both cases with a reliability of P=0.95, we claim that there is multicollinearity between these factors, that is, between the number of academies, institutes, universities and other educational institutions and the number of employees who perform intellectual and scientific work and in terms of scientific degrees between the number of doctors of science engaged in intellectual and scientific work and the number of doctors of philosophy (candidates of science) who perform intellectual and scientific work. Considering the negativity of multicollinearity, it is necessary to exclude each of the factors from consideration. In our case, the task is to analyze in detail what factors affect the effective indicator of organizational and innovative management of financial and personnel support of educational institutions. Therefore, from this point of view, none of the studied factors will be excluded from further econometric analysis. In the future, we determine the paired correlation coefficients, which indicate the impact of individual factors of financial and personnel support of higher education on indicator Y, that is, the financing of scientific

and intellectual works. Characterizing the obtained correlation pairs, we note that each of the selected factors of financial and personnel provision of higher education affects the effective indicator of financing scientific and intellectual works (Table 2).

Table 2. Results of the study of paired and partial correlation coefficients of the effect of selected indicators on the indicator of organizational and innovative management of financial and personnel support of educational institutions, 2013-2022.

Factors	Effective indicator: Financing of scientific and intellectual works - total, UAH million, Y			
	Partial correlation coefficients, r_{12}, r_{21}, r_{12}, r_{23}	Characteristics of partial correlation coefficients	Pairwise correlation coefficients, r_{YX1}, r_{YX2}, r_{YX21}, r_{YX22}, r_{YX23}	Characteristics of paired correlation coefficients
Institutions of higher education (universities, academies, institutes), unit., X_1	0.47	The connection is medium or direct	0.65	Communication is average
The volume of scientific workers who perform intellectual and scientific work – total, persons, X_2	0.47	The connection is medium or direct	0.88	The connection is tight
of them:				
doctors of science, persons, X_{21}	-0.99	The close relationship is reversed	0.81	The connection is tight
doctors of philosophy (candidates of sciences), persons, X_{22}	-0.57	The relationship is average, inverse	0.85	The connection is tight
graduate students, individuals, X_{23}	0.46	The connection is average, direct	0.64	Communication is average

At the next stage of modelling the organizational and innovative management of financial and personnel support by institutions of higher education, we calculate the transposed matrix and products, the coefficients of the equation of two-factor production functions to determine the theoretical and forecast values of financing scientific and intellectual works. Under such conditions, two-factor production linear regressions have the form (Table 3).

Table 3. Production linear regressions of the effect of selected indicators on the indicator of organizational and innovative management of financial and personnel support of educational institutions, 2013-2022.

Production linear regressions	Regression equation	Statistical coefficients and parameters two-factor production function				
		a_0	a_1	Characteristic	a_2	Characteristic
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of employees involved in the performance of intellectual and scientific works X_2 for financing scientific and intellectual works - total, UAH million, Y	$Yr=18633.22+9.76X_1-0.08X_2$	18633.22	9.76	When educational institutions (universities, academies, institutes) increase by 1 unit, the costs of carrying out scientific research will increase by UAH 9.76 million.	-0.08	When reducing the number of employees involved in the performance of intellectual and scientific works on 1,000 people, the funding of scientific and intellectual works will decrease by UAH 0.08 million.
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of doctors of science involved in the execution of intellectual and scientific works X_{21} for the financing of scientific and intellectual works - total, UAH million, Y	$Yr=18827.68+13.48X_1-1.24X_{21}$	18827.68	13.48	When educational institutions (universities, academies, institutes) increase by 1 unit. the costs of carrying out scientific research will increase by UAH 13.48 million	-1.24	When reducing the number of doctors of science involved in the performance of intellectual and scientific works on 1,000 people, the funding of scientific and intellectual works will decrease by UAH 1.24 million.
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of doctors of philosophy (candidates of sciences) who perform intellectual and scientific work X_{22} for financing scientific and intellectual works - total, UAH million, Y	$Yr=15041.71+12.18X_1-0.23X_{22}$	15041.71	12.18	When educational institutions (universities, academies, institutes) increase by 1 unit. the costs of carrying out scientific research will increase by UAH 12.18 million	-0.23	With a decrease in the number of doctors of philosophy (candidates of sciences) involved in the performance of intellectual and scientific works on 1,000 people, the financing of scientific and intellectual works will decrease by UAH 0.23 million.
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of graduate students involved in the performance of intellectual and scientific works X_{23} for the financing of scientific and intellectual works - total, UAH million, Y	$Yr=27588.56+20.30X_1-0.79X_{23}$	27588.56	20.30	When educational institutions (universities, academies, institutes) increase by 1 unit, the costs of carrying out scientific research will increase by UAH 20.30 million.	-0.79	When reducing the number of graduate students involved in the performance of intellectual and scientific works on 1,000 people, the funding of scientific and intellectual works will decrease by UAH 0.79 million.

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Analyzing the calculations of production linear regressions of the effect of selected indicators on the indicator of organizational and innovative management of financial and personnel support of academies, institutes, universities and other educational institutions, it can be noted that statistical coefficients and parameters of two-factor production functions, which are calculated by the method of least squares, have been determined. Next, we determine the general coefficient of determination (Table 4).

Table 4. Characteristics of the general coefficient of determination of production linear regressions of the effect of selected indicators on the indicator of organizational and innovative management of financial and personnel support of educational institutions, 2013-2022. *(Source: calculated by the authors)*

Production linear regressions	Regression equation	R^2	Characteristic
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of employees involved in the performance of intellectual and scientific works X_2 for financing scientific and intellectual works - total, UAH million, Y	$Yr=18633.22+9.76X_1-0.08X_2$	0.85	The general coefficient of determination indicates a close connection between the studied factors and the indicator, the variation of the costs of performing intellectual and scientific work by 84.66% is determined by the studied factors entered into the correlation model. The selected factors are selected successfully and significantly affect the studied indicator
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of doctors of science involved in the execution of intellectual and scientific works X_{21} for the financing of scientific and intellectual works - total, UAH million, Y	$Yr=18827.68+13.48X_1-1.24X_{21}$	0.80	The general coefficient of determination indicates a close connection between the studied factors and the indicator, the variation of the costs of performing intellectual and scientific work by 79.92% is caused by the studied factors entered into the correlation model. The selected factors are selected successfully and significantly affect the studied indicator
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of doctors of philosophy (candidates of sciences) who perform intellectual and scientific work X_{22} for financing scientific and intellectual works - total, UAH million, Y	$Yr=15041.71+12.18X_1-0.23X_{22}$	0.83	The general coefficient of determination indicates a close relationship between the studied factors and the indicator, the variation of the costs of performing intellectual and scientific work by 83.13% is determined by the studied factors entered into the correlation model. The selected factors are selected successfully and significantly affect the studied indicator
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of graduate students involved in the performance of intellectual and scientific works X_{23} for the financing of scientific and intellectual works - total, UAH million, Y	$Yr=27588.56+20.30X_1-0.79X_{23}$	0.79	The general coefficient of determination indicates a close connection between the studied factors and the indicator, the variation of the costs of performing intellectual and scientific work by 79.44% is caused by the studied factors entered into the correlation model. The selected factors are selected successfully and significantly affect the studied indicator

In order to determine the quality of the calculated models of production linear regressions of the effect of selected indicators on the indicator of organizational and innovative management of financial and personnel support of academies, institutes, universities and other educational institutions, it is necessary to conduct an analysis of Fisher's F-criterion. If the estimated value of Fisher's F-criterion is greater than its tabular value, then it is possible to forecast the effective indicator of costs for performing intellectual and scientific work (Table 5).

Table 5. Characteristics of Fisher's F-criterion as a determinant of the adequacy of production linear regressions of the effect of selected indicators on the indicator of organizational and innovative management of financial and personnel support of educational institutions, 2013-2022.

Production linear regressions	Regression equation	F_r	F_{tab}	Sign
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of employees involved in the performance of intellectual and scientific works X_2 for financing scientific and intellectual works - total, UAH million, Y	$Yr=18633.22+9.76X_1-0.08X_2$	19.31	4.74	The model is adequate to the experimental data
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of doctors of science involved in the execution of intellectual and scientific works X_{21} for the financing of scientific and intellectual works - total, UAH million, Y	$Yr=18827.68+13.48X_1-1.24X_{21}$	13.93	4.74	
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of doctors of philosophy (candidates of sciences) who perform intellectual and scientific work X_{22} for financing scientific and intellectual works - total, UAH million, Y	$Yr=15041.71+12.18X_1-0.23X_{22}$	17.25	4.74	
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of graduate students involved in the performance of intellectual and scientific works X_{23} for the financing of scientific and intellectual works - total, UAH million, Y	$Yr=27588.56+20.30X_1-0.79X_{23}$	13.53	4.74	

The next stage of our research involves a comparative characterization of statistical parameters and coefficients of production linear regressions of the effect of selected indicators on the indicator of organizational and innovative management of financial and personnel support of educational institutions, 2013-2022 using the built-in statistical function (Table 6).

Table 6. Calculation of statistical parameters and coefficients of production linear regressions of the effect of selected indicators on the indicator of organizational and innovative management of financial and personnel support of educational institutions, 2013-2022. Note: *(#n/d) has no data.

Statistical parameters and coefficients of production linear regressions	a_2	a_1	a_0
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of scientific workers who perform intellectual and scientific work X_2 on the financing of scientific and intellectual works - total, UAH million, Y			
	-0.08	**9.76**	**18633.22**
Se a_i	0.02	5.53	3344.08
$R^2\rightarrow$	0.85	1353.89	#n/d
Fp→	19.31	7.00	#n/d
SSR→	70795665.90	12831210.10	#n/d
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of doctors of science who perform intellectual and scientific work X_{21} on the financing of scientific and intellectual works - total, UAH million, Y			
	-1.24	**13.48**	**18827.68**
Se a_i	0.34	5.97	4038.78
$R^2\rightarrow$	0.80	1548.94	#n/d
Fp→	13.93	7.00	#n/d
SSR→	66832282.29	16794593.71	#n/d
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of doctors of philosophy (candidates of sciences) who perform intellectual and scientific work X_{22} on the financing of scientific and intellectual works - total, UAH million, Y			
	-0.23	**12.18**	**15041.71**
Se a_i	0.06	5.56	2851.80
$R^2\rightarrow$	0.83	1419.58	#n/d
Fp→	17.25	7.00	#n/d
SSR→	69520502.82	14106373.19	#n/d

(continued on next page)

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Table 6. Continued

Statistical parameters and coefficients of production linear regressions	**a_2**	**a_1**	**a_0**
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X1 and the number of graduate students performing intellectual and scientific work X_{23} on the financing of scientific and intellectual works - total, UAH million, Y			
	-0.79	**20.30**	**27588.56**
Se a_i	0.22	5.64	6345.93
$R^2\rightarrow$	0.79	1567.07	**#n/d**
Fp→	13.53	7.00	**#n/d**
SSR→	66436913.79	17189962.22	**#n/d**

In this case, it is advisable to determine the analytical characteristics of the effect of the selected indicators on the indicator of organizational and innovative management of financial and personnel support of educational institutions, which will have the form (Table 7).

Table 7. Analytical characteristics of the effect of selected indicators on the indicator of organizational and innovative management of financial and personnel support of educational institutions, 2013-2022 (*calculation fragment)

Analytical characteristics of the production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X1 and the number of scientific workers who perform intellectual and scientific work X2 on the financing of scientific and intellectual works - total, UAH million, Y								
Summing up			**Analysis of variance**					
Regression statistics				***df***	***SS***	***MS***	***F***	***Significance of F***
Multiple R		0.92	Regression	2	70795665.90	35397832.95	19.31	0.00
R-squared		0.85	Remainder	7	12831210.10	1833030.01		
Normalized R-squared		0.80	Together	9	83626876.00			
Standard error		1353.89						
Observation		10						
	Coefficients	***Standard error***	***t-statistics***	***P-Value***	***Lower 95%***	***Upper 95%***	***Lower 95,0%***	***Upper 95,0%***
Y-intersection. Financing of scientific and intellectual works, UAH million	18633.22	3344.08	5.57	0.00	10725.73	26540.72	10725.73	26540.72
Variable X_1. Institutions of higher education (universities, academies, institutes), units	9.76	5.53	1.77	0.12	-3.31	22.84	-3.31	22.84
Variable X_2 The number of employees involved in performing intellectual and scientific work, persons	-0.08	0.02	-4.41	0.00	-0.13	-0.04	-0.13	-0.04

So, it can be concluded that the use of economic-mathematical methods, tools and models, in particular two-factor regression models, Farrar-Glober tools, the method of least squares, analysis of Fisher's F-criterion in the modelling of organizational and innovative management of financial and personnel support of academies, institutes, universities and other educational institutions of Ukraine is an alternative optimal solution to the study of educational processes in the budgetary sphere. In the future, we forecast the main factors and the effective indicator of the organizational and innovative management of financial and personnel support of academies, institutes, universities and other educational institutions for the next period, 2025-2027 (Table 8).

Table 8. Forecasting of the main factors and performance indicators of organizational and innovative management of financial and personnel support of higher education institutions, 2025-2027.

Production linear regressions	Regression equation	Factors of influence				Effective indicator	
		Institutions of higher education (universities, academies, institutes), unit, X_1	Characteristic	The volume of scientific workers who perform intellectual and scientific work - total, persons, X_2	Characteristic	Expenses for performing intellectual and scientific work - total, UAH million, Y	Characteristic
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of employees involved in the performance of intellectual and scientific works X_2 for financing scientific and intellectual works - total, UAH million, Y	$Yr=18633.22+9.76X_1-0.08X_2$	**2025**					
		386	Unchanged	79419	Growth	15873.14	Growth
		2026					
		386	Unchanged	80471	Growth	15786.62	Growth
		2027					
		386	Unchanged	80711	Growth	15766.94	Growth
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of doctors of science involved in the execution of intellectual and scientific works X_{21} for the financing of scientific and intellectual works - total, UAH million, Y	$Yr=18827.68+13.48X_1-1.24X_{21}$	**Institutions of higher education (universities, academies, institutes), unit, X_1**	**Characteristic**	**The number of doctors of science involved in the performance of intellectual and scientific work, persons, X_{21}**	**Characteristic**	**Expenses for performing intellectual and scientific work - total, UAH million, Y**	**Characteristic**
		2025					
		386	Unchanged	7189	Growth	15448.53	Growth
		2026					
		386	Unchanged	7210	Growth	15422.69	Growth
		2027					
		386	Unchanged	7272	Growth	15345.89	Growth
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of doctors of philosophy (candidates of sciences) who perform intellectual and scientific work X_{22} for financing scientific and intellectual works - total, UAH million, Y	$Yr=15041.71+12.18X_1-0.23X_{22}$	**Institutions of higher education (universities, academies, institutes), unit, X_1**	**Characteristic**	**The number of doctors of philosophy (candidates of sciences), involved in the performance of intellectual and scientific work, persons, X21**	**Characteristic**	**Expenses for performing intellectual and scientific work - total, UAH million, Y**	**Characteristic**
		2025					
		386	Unchanged	18586	Growth	15438.26	Growth
		2026					
		386	Unchanged	18668	Growth	15419.27	Growth
		2027					
		386	Unchanged	18773	Growth	15394.94	Growth
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of graduate students involved in the performance of intellectual and scientific works X_{23} for the financing of scientific and intellectual works - total, UAH million, Y	$Yr=27588.56+20.30X_1-0.79X_{23}$	**Institutions of higher education (universities, academies, institutes), unit, X_1**	**Characteristic**	**The number of post-graduate doctors involved in the performance of intellectual and scientific work, persons, X_{21}**	**Characteristic**	**Expenses for performing intellectual and scientific work - total, UAH million, Y**	**Characteristic**
		2025					
		386	Unchanged	27763	Growth	15318.04	Growth
		2026					
		386	Unchanged	27797	Growth	15340.88	Growth
		2027					
		386	Unchanged	27971	Growth	15353.27	Growth

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Analyzing the forecast data of the main factors and the effective indicator of the organizational and innovative management of financial and personnel support of academies, institutes, universities and other educational institutions in the next period, we observe their growth, but other socio-economic factors should be taken into account because the external environment of the education market has a tendency to change and renewal.

The next stage of modelling the organizational and innovative management of financial and personnel support by institutions of higher education involves the analysis of the coefficient of elasticity in the forecast period, which is calculated separately for the factor that we are investigating. The coefficient of elasticity shows by how much per cent the indicator, i.e. financing of scientific and intellectual works, will change if the factor changes by 1% (Table 9).

Table 9. Results of the study of the coefficient of elasticity of the main factors and the effective indicator of the organizational and innovative management of financial and personnel support of educational institutions, 2025-2027. *(Source: calculated by the authors)*

Regressions	Equation	$Kelx_1$	Characteristic	$Kelx_2$	Characteristic
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of employees involved in the performance of intellectual and scientific works X_2 for the financing of scientific and intellectual works- total, UAH million, Y	$Yr=18633.22+9.76X_1-0.08X_2$	**2025**			
		0.237	With the increase in the number of academies, institutes, universities and other educational institutions for 1% funding of scientific and intellectual works will increase by 0.237%	-0.411	When reducing the number of employees involved in the performance of intellectual and scientific works by 1%, financing of scientific and intellectual works will decrease by 0.411%
		2026			
		0.239	With the increase in the number of academies, institutes, universities and other educational institutions for 1% funding of scientific and intellectual works will increase by 0.239%	-0.002	When reducing the number of employees involved in the performance of intellectual and scientific works by 1%, funding of scientific and intellectual works will decrease by 0.002%
		2027			
		0.239	With the increase in the number of academies, institutes, universities and other educational institutions for 1% funding of scientific and intellectual works will increase by 0.239%	-0.002	When reducing the number of employees involved in the performance of intellectual and scientific works by 1%, financing of scientific and intellectual works will decrease by 0.02%
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of doctors of science involved in the execution of intellectual and scientific works X_{21} for the financing of scientific and intellectual works - total, UAH million, Y	$Yr=18827.68+13.48X_1-1.24X_{21}$	**$Kelx_1$**	**Characteristic**	**$Kelx_{21}$**	**Characteristic**
		2025			
		0.328	With the increase in the number of academies, institutes, universities and other educational institutions for 1% funding of scientific and intellectual works will increase by 0.328%	-6.181	When reducing the number of doctors of science involved in the performance of intellectual and scientific works by 1%, funding of scientific and intellectual works will decrease by 6.181%
		2026			
		0.329	With the increase in the number of academies, institutes, universities and other educational institutions for 1% funding of scientific and intellectual works will increase by 0.329%	-0.030	When reducing the number of doctors of science involved in the performance of intellectual and scientific works by 1%, funding of scientific and intellectual works will decrease by 0.030%
		2027			
		0.330	With the increase in the number of academies, institutes, universities and other educational institutions for 1% funding of scientific and intellectual works will increase by 0.330%	-0.030	When reducing the number of doctors of science involved in the performance of intellectual and scientific works by 1%, funding of scientific and intellectual works will decrease by 0.030%

(continued on next page)

Table 9. Continued

Regressions	Equation	$Kelx_1$	Characteristic	$Kelx_2$	Characteristic
Production linear regression of the influence of the number of academies, institutes, universities and other educational institutions X_1 and the number of doctors of philosophy (candidates of sciences) who perform intellectual and scientific work X_{22} for financing scientific and intellectual works - total, UAH million, Y	$Yr=15041.71+12.18X_1-0.23X_{22}$	**$Kelx_1$**	**Characteristic**	**$Kelx_{22}$**	**Characteristic**
		2025			
		0.296	With the increase in the number of academies, institutes, universities and other educational institutions for 1% funding of scientific and intellectual works will increase by 0.296%	-0.105	When reducing the number of doctors of philosophy (candidates of sciences) involved in the performance of intellectual and scientific works by 1%, funding of scientific and intellectual works will decrease by 0.105%
		2026			
		0.298	With the increase in the number of academies, institutes, universities and other educational institutions for 1% funding of scientific and intellectual works will increase by 0.298%	-0.106	When reducing the number of doctors of philosophy (candidates of sciences) involved in the performance of intellectual and scientific works by 1%, funding of scientific and intellectual works will decrease by 0.106%
		2027			
		0.298	If the total number of academies, institutes, universities and other educational institutions increases by 1%, funding of scientific and intellectual works will increase by 0.298%	-0.107	When reducing the number of doctors of philosophy (candidates of sciences) involved in the performance of intellectual and scientific works by 1%, funding of scientific and intellectual works will decrease by 0.107%
Production linear regression of the influence of the number of academies, institutes, universities and other educational institution X_1 and the number of graduate students involved in the performance of intellectual and scientific works X_{23} for the financing of scientific and intellectual works - total, UAH million, Y	$Yr=27588.56+20.30X_1-0.79X_{23}$	**$Kelx_1$**	**Characteristic**	**$Kelx_{23}$**	**Characteristic**
		2025			
		0.494	With the increase in the number of academies, institutes, universities and other educational institutions for 1% funding of scientific and intellectual works will increase by 0.494%	-1.380	When reducing the number of graduate students involved in the performance of intellectual-scientific works by 1%, funding of scientific-intellectual works will decrease by 1.380%
		2026			
		0.496	With the increase in the number of academies, institutes, universities and other educational institutions for 1% funding of scientific and intellectual works will increase by 0.496%	-1.389	When reducing the number of graduate students involved in the performance of intellectual and scientific works by 1%, funding of scientific and intellectual works will decrease by 1.389%
		2027			
		0.497	With the increase in the number of academies, institutes, universities and other educational institutions for 1% funding of scientific and intellectual works will increase by 0.497%	-1.400	When reducing the number of graduate students involved in the performance of intellectual and scientific works by 1%, funding of scientific and intellectual works will decrease by 1,400%

At the last stage of the research analysis, modelling and forecasting of the main factors and the performance indicator, we will carry out a graphical presentation of the actual, theoretical and forecast values of the factors and the indicator of the costs of performing intellectual and scientific work in general and in terms of scientific degrees. Figure 1 presents the dynamics of the actual and forecast values of the number of academies, institutes, universities and other educational institutions in Ukraine, 2013-2022, 2025-2027.

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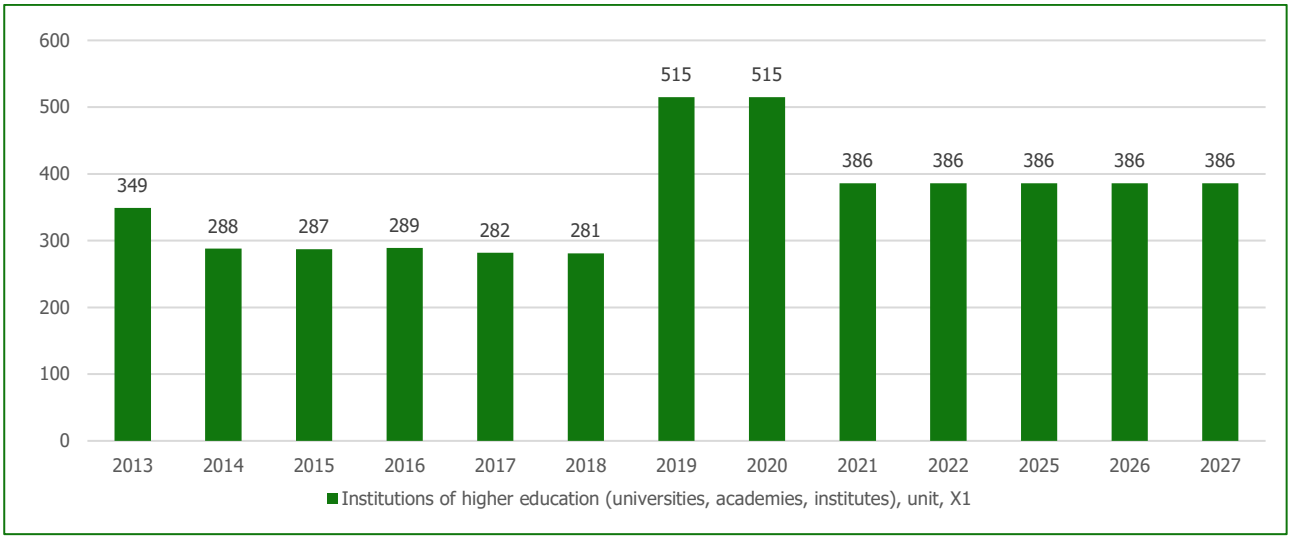


Figure 1. Actual and forecast values of the number of academies, institutes, universities and other educational institutions of Ukraine, 2013-2022, 2025-2027. *(Source: forecast values of the number of academies, institutes, universities and other educational institutions of Ukraine were calculated by the authors)*

Table 10 presents a comparative description of the actual data, the number of scientific workers who perform intellectual and scientific work, both in general and in terms of scientific degrees in 2022 with forecast data. An absolute and relative comparison was made for further graphical presentation.

Table 10. Comparative characteristics of the amount of scientific workers performing intellectual and scientific work.

Years	The volume of scientific workers who perform intellectual and scientific work - total, persons, X_2				Deviation of 2022 from the forecast +,-, total persons	Relative deviation of 2022 from the forecast, %
	Total, persons, X_2	of them:				
		doctors of science, persons, X_{21}	Doctor of Philosophy (Candidates of Science), persons, X_{22}	graduate students, individuals, X_{23}		
2022	79154	7106	18554	27747	X	
2025	79419	7189	18586	27763	265	0.34
2026	80471	7210	18668	27797	1318	1.66
2027	80711	7272	18773	27971	1557	1.97
Years	**Deviation of 2022 from the forecast +,-, doctors of science, persons**	**Relative deviation of 2022 from the forecast, %**	**Deviation in 2022 from the forecast +,-, Doctor of Philosophy (Candidates of Sciences), persons**	**Relative deviation of 2022 from the forecast, %**	**Deviation in 2022 from the forecast +, -, graduate students, persons**	**Relative deviation of 2022 from the forecast, %**
2022	X		X		X	
2025	83	1.16	32	0.17	16	0.06
2026	104	1.46	114	0.62	50	0.18
2027	166	2.33	219	1.18	225	0.81

Block Figure 2 graphically presents the percentage increase in the number of employees performing intellectual and scientific work, both in general and in terms of academic degrees for the forecast period of 2025-2027 compared to 2022.

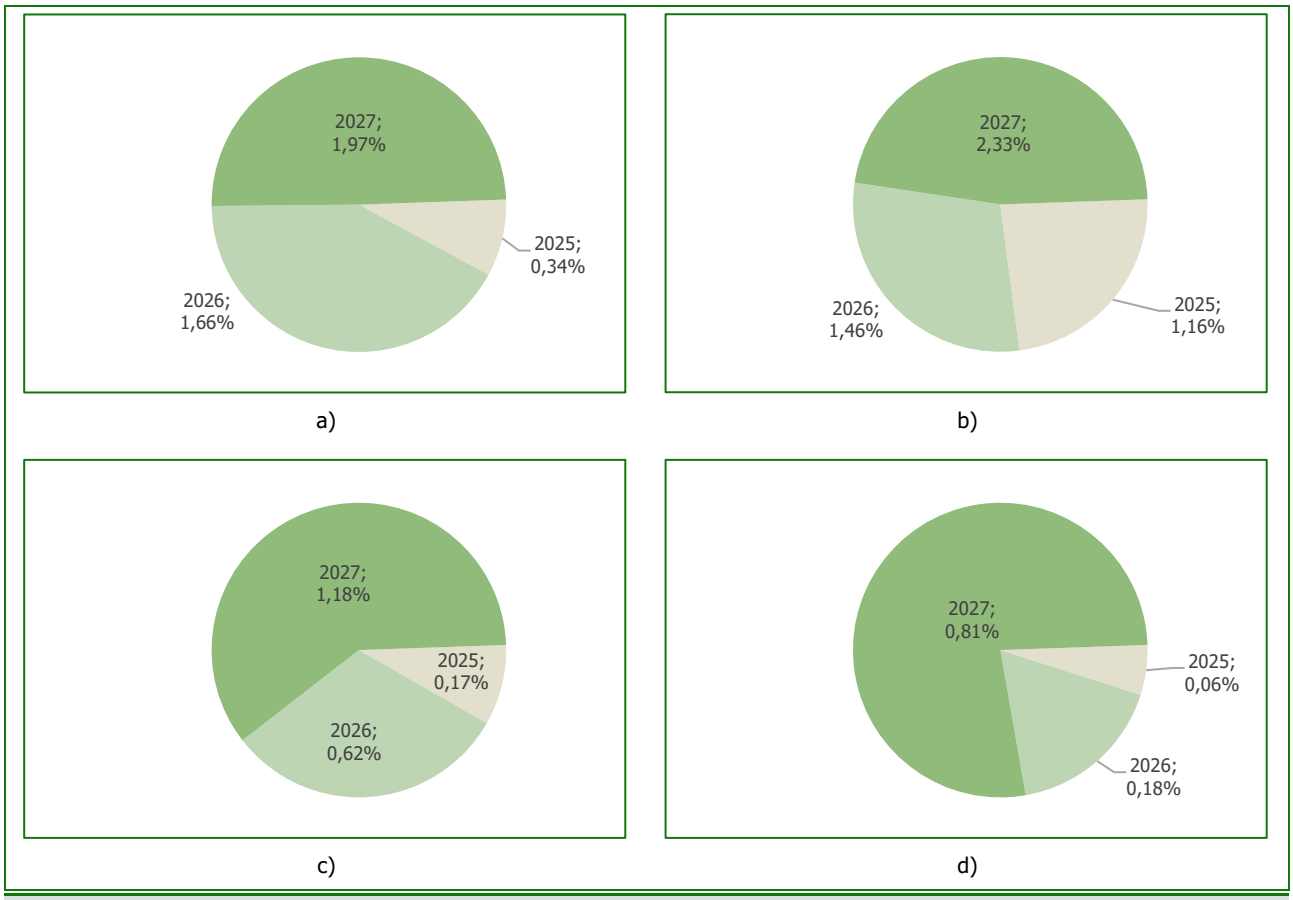
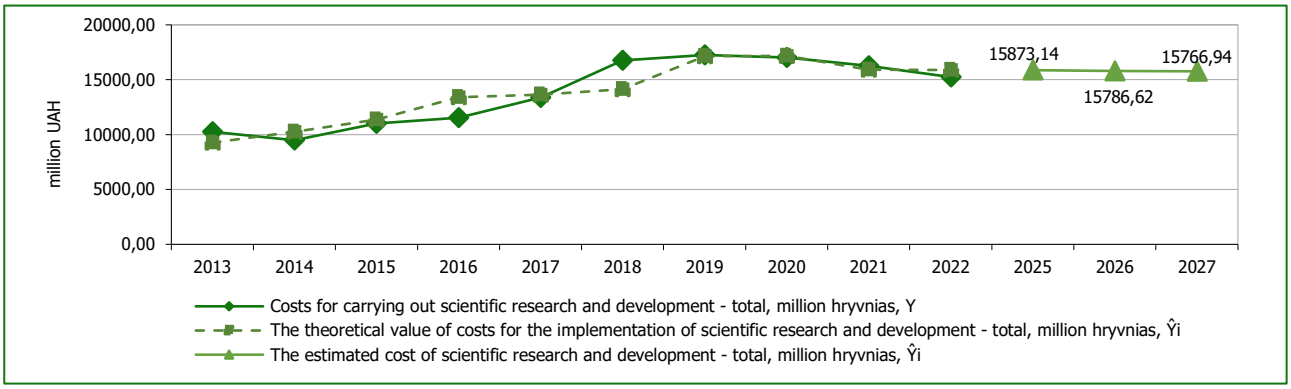


Figure 2. The estimated value of the number of employees, who perform intellectual and scientific work, %, 2025-2027. Note: a) The estimated value of the number of employees, who perform intellectual and scientific work; b) The forecast value of the number of doctors of science, who perform intellectual and scientific work; c) The forecast value of the number of doctors of philosophy (candidates of sciences) who perform intellectual and scientific work; d) The forecast value of the number of graduate students, who perform intellectual and scientific work. *(Source: calculated by the authors)*

Graphically, the actual, theoretical, and forecast values of the expenses for performing intellectual and scientific work by scientific workers of Ukraine in general and in terms of scientific degrees, 2013-2022, and 2025-2027, are presented by the block of Figure 3.



a)

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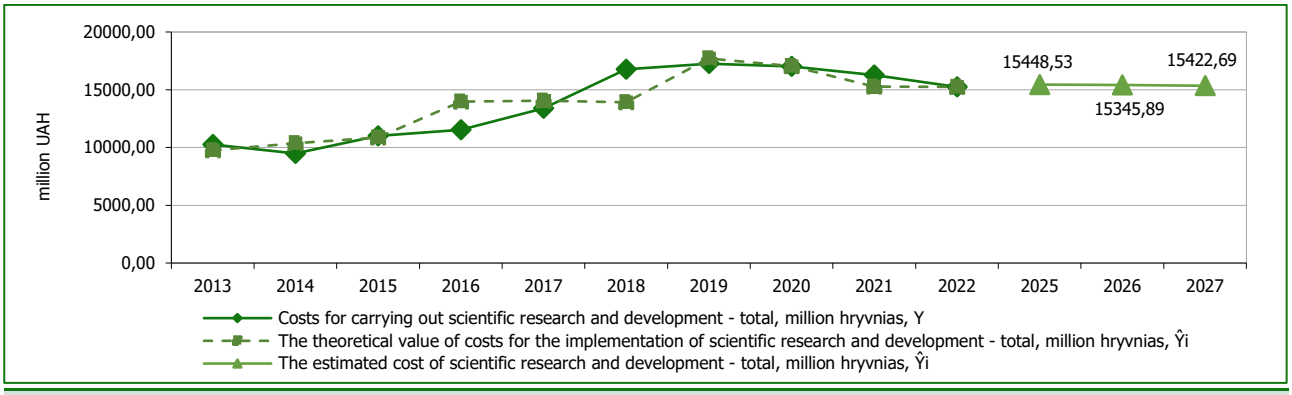
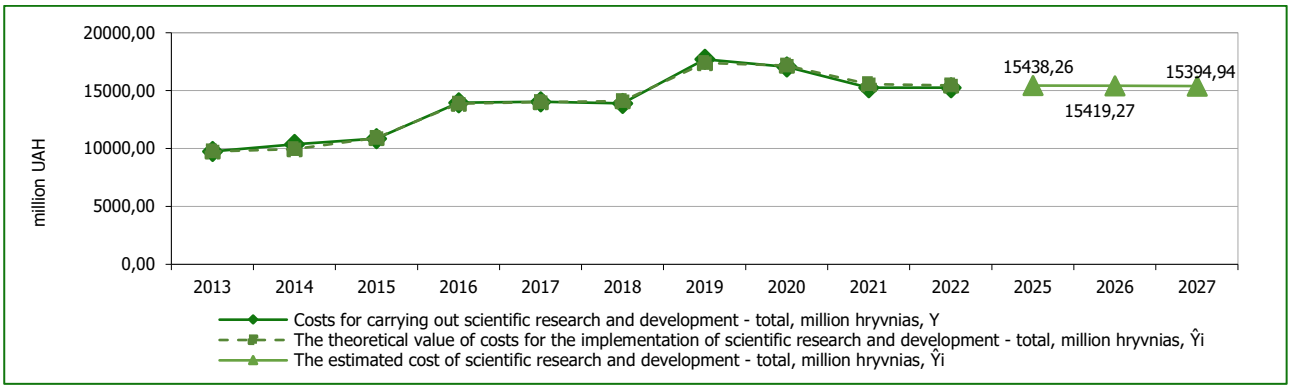
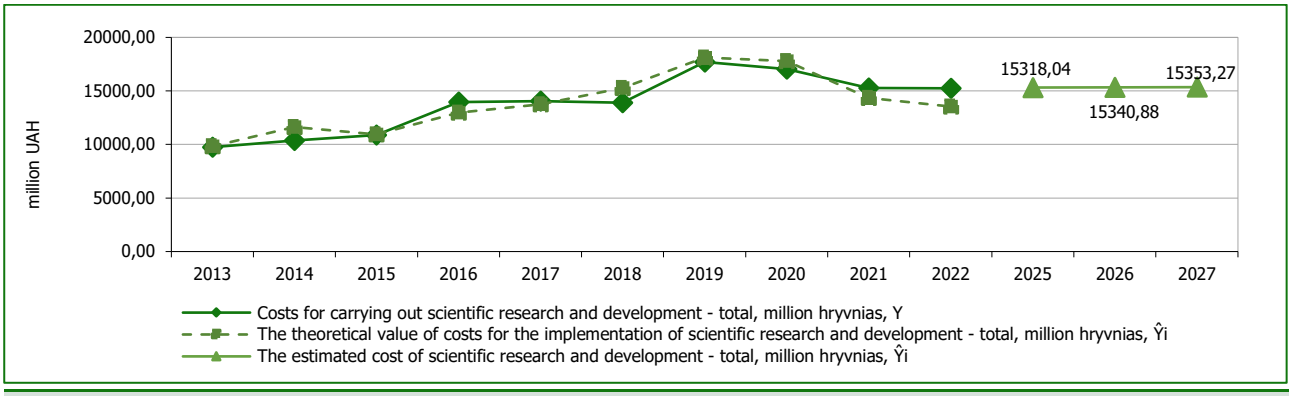


b)



c)



d)

Figure 3. Actual, theoretical, forecast values of financing intellectual and scientific activities by specialists of Ukraine, 2013-2022, 2025-2027. Note: a) Actual, theoretical, forecast values of expenses for intellectual and scientific work by academic workers of Ukraine; b) Actual, theoretical, forecast values of costs for intellectual and scientific work by doctors of science; c) Actual, theoretical, forecast values of expenses for intellectual and scientific work by doctors of philosophy (candidates of sciences); d) Actual, theoretical, forecast values of costs for intellectual and scientific work by graduate students. *(Source: suggested by the authors)*

So, after analyzing the results of the determination, correlation equations, values of Fisher's F-criterion, t-statistics, elasticity coefficients, it can be concluded that each factor affects the performance indicator - the costs of intellectual and scientific work by Ukrainian scientists, as one of the key factors of organizational and innovative management of financial and personnel support of educational institutions. Summarizing the research, it should be noted the expediency and necessity of economic-mathematical methods of modelling complex phenomena, but it is economic-mathematical methods and models that occupy key positions among statistical observations and forecasts on the market of educational services, in particular, organizational and innovative management of financial and personnel support of educational institutions.

DISCUSSION

Our conducted research shows that the issue of organizational and innovative management of financial and personnel support of institutions of higher education in the conditions of restoration of intellectual potential has not been investigated in any scientific source. As an example, the articles (Voznyuk et al., 2022; Bakhmat et al., 2022; Kasych et al., 2021) do not sufficiently define the adaptive management tools of modern institutions of higher education, taking into account the unstable external environment and risks of the financial system. Scientists (Gryshchenko et al., 2023; Kubitskyi et al., 2022) thoroughly define the tools of interaction between business, government, and educational institutions, but they do not sufficiently take into account the factors that can change communications, especially in turbulent educational markets. Scientists (Oseredchuk et al., 2022), despite the innovative tools for monitoring distance education, practically do not consider the factors that will stimulate the attraction of intellectual potential for higher education institutions. Scientists (Jacob and Gokbel, 2018) cite the factors influencing higher education of financial trends, however, they are appropriate for another country, and their analysis, in the conditions of Ukraine, is inappropriate. In our study, the best methods of diagnosis, monitoring and forecasting of organizational and innovative management of financial and personnel support of institutions of higher education in the conditions of restoration of intellectual potential are taken into account. However, taking into account the rapid change in the external environment, it is advisable to review the tools and indicators of financial and personnel management of institutions of higher education systematically, taking into account the present.

CONCLUSIONS

Therefore, the article proposes a method of formation, forecasting and evaluation of organizational and innovative management of financial and personnel support of institutions of higher education in conditions of restoration of intellectual potential. It was emphasized that the management of higher education institutions is a complex task that includes various aspects such as administrative management, financial planning, personnel policy, cluster partnership development, public relations and many others. Economic and mathematical methods, tools and models, including two-factor regression models, Farrar-Glober tools, the method of least squares, and Fisher's F-criterion analysis, were implemented to achieve the goal and objectives of scientific research. It was determined that in 2025-2027, the number of scientific workers performing intellectual and scientific work will increase, in particular, in 2027, this indicator will be equal to 80,711 people, which is 1.97% more than in 2022. It was determined that the dynamic number of academies, institutes, universities and other educational institutions will be relatively stable and unchanged. It was found that the number of doctors of science, doctors of philosophy who perform intellectual and scientific work will increase. The same trend will apply to the number of graduate students, who in 2027 will be 0.1% of the total number of employees engaged in scientific research. The largest number of scientific research performers in 2027 will be specialists who have a doctor of science degree. Taking into account the trends of forecasting financial and personnel support in order to improve the management of higher education institutions, managers should pay attention to the need to attract investments to improve the quality of scientific research. The formation of the policy of financial support should be a priority measure to improve the organizational and innovative management of institutions of higher education in conditions of restoration of intellectual potential.

The prospects of our further scientific research will be the search for key aspects and adaptive directions of managing the financial and personnel support of the intellectual potential of educational institutions, taking into account the European experience.

ADDITIONAL INFORMATION

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Data curation: *Mykhailo Verhun*
Formal Analysis: *Mykhailo Verhun*
Methodology: *Mykhailo Verhun, Antonina Verhun*
Software: *Mykhailo Verhun, Alina Oliinyk, Hanna Popovychenko, Oleksandr Pomaz, Tymur Ishchejkin*
Resources: *Alina Oliinyk, Hanna Popovychenko, Oleksandr Pomaz, Tymur Ishchejkin*
Supervision: *Mykhailo Verhun*
Validation: *Mykhailo Verhun, Alina Oliinyk, Hanna Popovychenko, Oleksandr Pomaz, Tymur Ishchejkin, Antonina Verhun*
Investigation: *Mykhailo Verhun, Antonina Verhun*
Visualization: *Alina Oliinyk, Hanna Popovychenko, Oleksandr Pomaz, Tymur Ishchejkin, Antonina Verhun*

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Writing – original draft: *Mykhailo Verhun, Alina Oliinyk, Hanna Popovychenko, Oleksandr Pomaz, Tymur Ishchejkin, Antonina Verhun*

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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ОРГАНІЗАЦІЙНО-ІННОВАЦІЙНЕ УПРАВЛІННЯ ФІНАНСОВИМ ТА КАДРОВИМ ЗАБЕЗПЕЧЕННЯМ ІНТЕЛЕКТУАЛЬНОГО ПОТЕНЦІАЛУ ЗАКЛАДІВ ВИЩОЇ ОСВІТИ

На цьому історичному етапі розвитку Україна переживає найбільш важкі часи, починаючи з періоду здобуття незалежності. Змінилася логіка державного управління, фінансово-кредитних відносин, соціальних орієнтирів та загалом зовнішньої політики нашої країни. Не оминули такі зміни й секторів освіти та науки, у яких відбуваються не завжди позитивні зрушення. Скоріше навпаки, спостерігається тенденція стагнації освіти, викликаної слабкою інституціональною підтримкою, недосконалою кадровою та фінансовою політикою. Агресивна політика рф відносно нашої країни обумовила потужний сплеск внутрішньої та зовнішньої міграції населення, у тому числі високопрофесійних і вузькокваліфікованих працівників, які були залучені в освітні та наукові процеси й засвідчили свою ефективність. У таких умовах необхідним стає визначення орієнтирів організаційно-інноваційного управління фінансовим і кадровим забезпеченням академій, інститутів, університетів та інших освітніх установ в умовах відновлення інтелектуального потенціалу. Особливо важлива розробка методики його оцінювання та прогнозування. У такому контексті в статті запропоновано шляхи оцінювання, прогнозування та вдосконалення організаційно-інноваційного управління фінансовим і кадровим забезпеченням закладів вищої освіти. У процесі написання статті використані економіко-математичні методи, інструменти й моделі, зокрема двофакторні регресійні моделі, інструменти Фаррара-Глобера, метод найменших квадратів, аналіз F-критерію Фішера. Ураховуючи тенденції прогнозування фінансового та кадрового забезпечення з метою поліпшення управління закладами вищої освіти, менеджерам слід звернути увагу на необхідність залучення інвестицій для підвищення якості виконання наукових досліджень.

Ключові слова: управління, фінансове та кадрове забезпечення, інтелектуальні ресурси, заклади вищої освіти, кластерне партнерство, наукові дослідження й розробки, прогнозування, соціально-економічний розвиток

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