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S. Cheremisina¹,
orcid.org/0000-0003-1546-7714,
V. Rossokha¹,
orcid.org/0000-0002-9208-8948,
O. Petrychenko²,
orcid.org/0000-0002-1662-2563,
L. Fedoryshyna³,
orcid.org/0000-0003-1577-6699,
N. Dobrianska⁴,
orcid.org/0000-0002-0826-8840

1 – National Research Center “Institute of Agrarian Economics”, Kyiv, Ukraine, e-mail: CheremisinaSvitlana@gmail.com
2 – Institute of Feed Research and Agriculture of Podillya of NAAS, Vinnytsia, Ukraine
3 – Vinnytsia National Agrarian University, Vinnytsia, Ukraine
4 – Odesa Polytechnic State University, Odesa, Ukraine

THE COST OF FORMATION AND PROBLEMS OF EFFECTIVE REALIZATION OF LABOR POTENTIAL IN UKRAINE

Purpose. To substantiate the theoretical and methodological provisions and develop practical recommendations for organizing and effective labour potential fulfilment.

Methodology. The authors used a number of methods: comparative analysis (in performance analysis and sectoral structuring of labour potential), computational and constructive (in a comprehensive study on organizing and fulfilling labour potential), economic analysis (to assess the cost of labour potential in priority sectors), effectiveness evaluation of investment in human capital (to assess the return on labour costs), expert evaluation methods (in assessing the priority of sectoral components of the economy), tabular (to illustrate research results), abstract-logical (to draw the conclusions).

Findings. The article studied an evolutionary way of organizing the “labour potential” category. The expedience has been proved to consider systematically the “labour potential” category under the modern conditions of social and economic development and with a combination of economic, technical-technological, intellectual, budget and resource-based, social and environmental components. The authors present their own vision of system justification for the “labour potential” category concept. The article studied the process of organizing labour potential in terms of the human capital theory and summarized the classification of investment types in its formation and development. A comprehensive analysis of the current condition was performed and key issues were identified with regard to labour potential in Ukraine. Negative tendencies of reduction of the number of employees in all types of economic activity and gradual reduction of the number of vacancies in many specialties and professions were revealed. The analysis of the intersectoral differentiation of the average monthly salary level in Ukraine for the period 2014–2021 was carried out. Trends have been established concerning training of specialists in the fields of knowledge, as well as the process of forming their potential.

Originality. The authors proposed and tested the methodological approach to an estimation of conditions for organizing and fulfilling labour potential, including the following methodological techniques: calculation of investments in organizing labour potential; assessment of labour potential effectiveness in the sectoral structure of the economy, taking into account the payback period of costs associated with its development. The efficiency of the use of labor potential in the sectoral structure of the economy of Ukraine is assessed and directions for its increase are suggested.

Practical value. Calculation of investments in the formation of labor potential for a number of priority sectors and areas of the economy of Ukraine is performed. It is established that in most areas of training and areas of activity there is a lag in the average wage from the annual (monthly) income, which could be obtained by implementing the alternative of investing not in the formation of human capital of future bachelors and masters, and in placement of funds in the banking system. The results can be used both in research and in the practice of management to manage the formation of labor potential in terms of sectors of the economy of Ukraine.

Keywords: *labor potential, human capital, efficiency, payback, investment, wages, income*

Introduction. The current stage of the social and economic development shows a steady downward trend in real income, which significantly hinders the labour potential development. Low purchasing power due to unreasonably low labour costs, allows meeting only the basic needs of the majority of population and does not contribute to the level and quality of life observed in the economically developed European countries. The adverse consequence of the national economy is the formation of a social structure with a weakened middle-class position and shift of a significant part of the population in terms of income below the poverty line.

It is possible to eliminate these disparities through a balanced interaction of all structural components that ensure economic growth. At the same time, an emphasis is made on the development, quality and effective fulfilment of labour potential by creating the necessary conditions for comprehensive and harmonious development of the individual and providing opportunities for self-fulfilment in various fields.

Literature review. A significant number of theoretical concepts and scientific developments by the well-known national

and foreign scientists have dealt with an issue of organizing and effective labour potential fulfilment. Given the extensive period of the “labour potential” concept evolution, it should be noted that the quantitative and qualitative analysis of a human factor and its role in the economic systems development have been the focus of attention of the leading global economic thinking representatives in various historic periods, namely: U. Petty, A. Smith, D. Ricardo, K. Marx, A. Marshall, I. Fischer, T. Schultz, G. Becker, J. Schumpeter, R. Solow.

The modern foreign trends in the management and development of human capital were studied by R. E. Janshanlo, O. Y. Kogut [1], B. Mitlykh, S. Kvitka [2], M. Hryvnyak, K. Melikhova [3], A. Vergara-Romero, F. Márquez Sánchez [4], M. Hitka, A. Kucharcikova, P. Starchon [5]. Among Ukrainian scientists, V. P. Antoniuk [6], M. V. Semikina, L. D. Zapirchenko [7], O. A. Hrishnova [8], E. M. Libanova [9] covered the issues of labour potential in their academic papers. Methodical aspects of measuring labor potential and analysis of methodological approaches to its evaluation were studied by N. Mazur [10], O. M. Komarnytska [11], L. D. Garmider, I. V. Taranenko [12], T. Hilorme [13].

However, there are many questions regarding the development and justification of methodological approaches to as-

sessing the formation and implementation of labor potential, taking into account the objective features of the current state of the economy as a basis for its functioning; identifying prospects for the development of labor potential at the present stage of economic progress requires further research.

Purpose. The purpose of the article is to substantiate the theoretical and methodological provisions and develop practical recommendations for organizing and fulfilling effective labour potential.

Achieving this purpose provides for addressing the following tasks: to clarify the theoretical provisions of the “labour potential” category concept on the basis of retrospective analysis and systematization of existing conceptual approaches to the processes of organizing and fulfilling labour potential; to substantiate and test the methodological approach to an assessment of organizing and fulfilling labour potential taking into account objective modern condition features of branches of economy as a basis for its functioning; to identify labour potential development prospects at the present stage of economic progress.

Methods. The authors used a number of methods: comparative analysis (in performance analysis and sectoral structuring of labour potential), computational and constructive (in a comprehensive study on organizing and fulfilling labour potential), economic analysis (to assess the cost of labour potential in priority sectors), effectiveness evaluation of investment in human capital (to assess the return on labour costs), expert evaluation methods (in assessing the priority of sectoral components of the economy), tabular (to illustrate research results), graphical (to illustrate research results on systematic justification of “labour potential” category concept), abstract-logical (to draw the conclusions).

Results. The entry of “labour potential” category into scientific circulation in the 80s was due to the intensified production and labour activities, recognition of the human factor role in economic development and new requirements for the quality of labour in post-industrial society.

The modern concepts comprehensively consider a person as a producer of public goods and a consumer, as well as an entity that has a range of productive abilities, knowledge and skills. Thus, the person creates, starts up and defines ways of using technics and technologies that, in turn, put forward new, constantly growing requirements to its physical and intellectual abilities.

It should be noted while examining the evolutionary path of organizing the “labour potential” category that until the early 90s of the 20th century, the related and derived concepts had been used with varying intensity, such as: economic man, manpower, labour force, human factor, human capital, human potential. At the same time, scientists focused on the study on demographic conditions of human resources, as well as the impact of education level of an individual, and, subsequently, the education of the whole nation on workforce productivity [7].

The modern economic theory continues using widely the “man power” concept. However, it has different interpretations depending on the level of economic development. Thus, at the microeconomic level, the “man power” category is used to characterize the productive abilities of an individual, and at the regional and macroeconomic levels – to characterize the number and composition of the economically active population.

The “labour resources” term was introduced into scientific circulation by S.G. Strumilin in the 1920s (Strumilin S. G., 1982). This term became widespread in the context of the new economic policy (NEP) and extensive type of economic development. It characterized man as a passive object of external management. In the early 60s of the 20th century, the economic category of “human capital” acquires a substantive content in the works by the American economist T. Schultz.

Schultz T. understood the human capital as the socially significant qualitative characteristics of the population, which

are formed as a result of investment [14]. The “human potential” concept, which emerged in the early 90s of the 20th century, was a result of the information society development. It recognizes human capital and knowledge as the main economic growth resources.

The “human potential” category is a synthesis of two basic concepts: human capital and quality of life [6, 8]. It takes into account both investment in man and the characteristics of social environment that shapes individual personality and conditions of its existence. Labour potential is a generalizing indicator of a personal production factor, which includes demographic, medical and biological, educational, professional and qualification components, as well as morality.

The “labour potential” and “human capital” categories have much in common, as they characterize the psychophysiological, professional, qualification, moral and other indicators of personal development. The labour potential of a person determines the possibilities of its participation in economic activity, and the “human capital” concept focuses on those qualities that can be a source of income for an individual, enterprise, region or national economy as a whole. Thus, the “human capital” concept is a valuable form of the labour potential expression, which allows measuring the effectiveness of investment in man.

In terms of human capital theory, the process of organizing labour potential is characterized with acquisition by an individual of certain knowledge, skills and abilities that provide for further labour supply to the labour market. The formation of labour potential occurs, as a rule, prior to labour activity of an individual, at the stage of its personal formation. At the same time, it is important to note that the process of organizing labour potential is carried out in stages.

At the first stage of organizing labour potential, there is a development and qualitative improvement of both innate abilities of the individual transferred at the genetic level from parents, and the abilities acquired as a result of education in a family and preschool educational institution. At the second stage, there is a further development of individual abilities and knowledge in the process of systematic training in obtaining secondary, vocational and other types of education. The final result at the stage of organizing labour potential is the psychological formation and development of a personality, the formation of a certain worldview and way of thinking, which in the future determines the life preferences of the individual, his lifestyle and professional orientation. The labour potential fulfilment is a process and result of its use in the production of tangible and intangible goods and services.

Summarizing the theoretical developments of foreign and national scientists on the main sources of organizing and developing labour potential, we can identify the following classification of investment types in its formation and development [6, 15]:

- costs associated with the birth and upbringing of children, which directly affect the size and types of costs in the future;
- costs aimed at maintaining the health of the individual, his physical development and mental state, which expands the limits of working age;
- costs associated with education and training of the employee;
- costs associated with migration in search of better employment conditions, which directly affects the formation of labour supply and demand at the regional and national levels;
- costs associated with the search for economically important information on prices and incomes, market conditions, which subsequently determine the future sphere of economic activity of the individual;
- costs of basic and applied research and development.

It should be noted that today’s economy of Ukraine experiences a need for qualified personnel, due to the presence of a number of contradictions in the labour potential development, including:

- irregularities of the interaction mechanism between the labour market and the market of educational services;
- reduction in educational services of vocational schools, which negatively affects the supply of blue-collar jobs;
- consequences of demographic crisis of the 90s of the 20th century, which in recent years have led to an increase in the share of age group “60 and older” among the total population, which negatively affects the demographic burden;
- decreasing training quality due to the low level of material and technical facilities of the educational institutions, etc.

The dynamics of indicator – the number of employees by all types of economic activity for the analysed period (2012–2020) – is characterized by a negative trend –13.9 % (or 2683.1 thousand people) reduction. The largest employment reduction was found in financial and insurance activities, industry, education, medicine, transport, construction).

At the same time, it is worth paying attention to the reduction in the number of vacancies in many types of economic activity. Aggregate demand in the national labor market decreased over the analyzed period by 11.9 % (from 48.6 thousand vacancies in 2012 to 43.3 thousand in 2020). The highest rates of reduction in the need for workers were found in the mining industry (2.2-fold), in financial and insurance activities (2-fold), in agriculture (by 40 %), in construction (by 36.4 %), in the public sector management (36.8 %). An increase in the number of vacancies was recorded in education (1.7-fold), administration (2.8-fold), science (by 25 %), trade (by 17.3 %).

The secondary vocational education in Ukraine is represented by 338 colleges, technical schools, and colleges with more than 173.5 thousand students. Vocational training is carried out in 22 areas of knowledge. The sphere of higher education includes 281 higher education institutions, including 203 public and 78 private.

The number of students in the colleges and technical schools is 165.4 thousand people, 118.9 thousand (or 72 %) students receive knowledge at the expense of the budget, 46.7 thousand (or 28 %) study on a contract basis. The number of students in higher education institutions of Ukraine is 1.13 million people, of whom 462.8 thousand students (or 40.9 %) study at the expense of the state budget, on a contract basis – 668.4 thousand (59.1 %). Regarding the distribution of freelance students by specialties in percentage, we can note the following: management and administration preferred 12.8 %, education and pedagogy chose 11.8 %, health – 8.3 %, information technology – 7.9 %, law – 7.6 %, social and behavioral sciences – 5.7 %.

The analysis of intersectoral differentiation of the average monthly wage in Ukraine for the period 2014–2020 (Table 1) allows summarizing as follows [16].

The maximum level of employee compensation in 2021 was found in air transport (UAH 27,390), information and telecommunication (UAH 24,929), financial sphere (UAH 23,312). The value of average monthly wage in these areas in 2021 is almost 2 times higher than the average wage in the country. The lowest levels of wage have developed in postal and courier activities, medicine, creativity and art, education, librarianship, agriculture.

As noted above, one can say about the effectiveness of fulfilling labour potential in the case where its use in the process of labour and entrepreneurial activity is accompanied by an increase in employee income. Only under this condition, labour potential can be considered as one of the forms of capital formed as a result of investment in human resources development.

However, it is extremely difficult to make a detailed calculation of all types of costs that are necessary for the formation of this special type of capital (human). This is due to the fact that obtaining professional skills in each area of activity requires different items and costs. In addition, households have different levels and sources of income, some have salaries only, and others, in addition to salaries, have different types of social benefits (pensions, scholarships, benefits), as well as property income, interest on capital, and others.

As part of the study, the calculation of investments in organizing labour potential was performed for a number of priority sectors and areas of the Ukrainian economy based on the value of minimum wage set in the country at the moment. The calculations used the “other things equal” principle, i.e. dynamics of prices during the entire period of labour potential formation, while changes in the market basket composition, which determines the subsistence level, were not taken into account.

As of 1.12.2021, the minimum wage in Ukraine was UAH 6,500). The cost of providing for the living needs of children under 6 years is calculated as follows: $UAH\ 6,500 \times 0.8 \times 12\ months \times 6\ years = UAH\ 374,400$.

We take into account that most graduates graduate from secondary schools at the age of 17–18. Next, in our calculation we apply the value of the minimum wage in full. Together, for 12 years, the cost of life benefits is: $UAH\ 65,00 \times 12\ months \times 12\ years = UAH\ 936,000$.

In total for 18 years of life of the child the sum of expenses for maintenance will make: $374,400 + 936,000 = UAH\ 1,310,400$.

As part of our study, we believe that school graduates enter higher education institutions and obtain higher education in bachelor’s programs (4 years), for master’s degree (+2 years in the bachelor’s program, a total of 6 years).

The cost-of-living benefits for students for the period of study will be: under the bachelor’s program for 4 years: $UAH\ 6,500 \times 12\ months \times 4\ years = UAH\ 312,000$; under the master’s program for 6 years: $UAH\ 6,500 \times 12\ months \times 6\ years = UAH\ 468,000$.

In the calculation we will take into account the receipt of educational services under the bachelor’s and master’s degrees on a commercial basis (thus, we exclude this type of income for students as a scholarship). We take as a basis the average data on the cost of training in various areas of training, valid in Ukraine in public and private HEI in the 2020–2021 academic year [17, 18].

The cost of training under bachelor’s program per year in the following specialties: philology – UAH 19,488 (4 years – UAH 77,952); economy – UAH 18,637 (74,548); political science – UAH 18,411 (73,644); management – UAH 18,716 (74,864); marketing – UAH 19,101 (76,404); law – UAH 24,095 (96,380); international relations – UAH 22,656 (90,652); agricultural sciences (agronomy, horticulture, agro-engineering for 4 years – UAH 17,937 (UAH 71,748).

If future employees continue their studies in the master’s program, the cost of their training will be: philology – UAH 24,360 (for 2 years – UAH 48,720); economy – UAH 23,290 (46,580); political science – UAH 23,013 (46,026); management – UAH 23,395 (46,790); marketing UAH 23,870 (47,740); law – UAH 30,118 (60,236); international relations – UAH 28,320 (UAH 56,640); agricultural sciences (agronomy, horticulture, agroengineering – UAH 22,420).

The results of the above calculations are systematized in Table 2 [16].

Calculation analysis on the cost of labour potential in different areas of activity allows us to draw the following conclusions. The costs associated with organizing labour potential for bachelor’s program graduates before their employment, in different specialties do not differ significantly and range from UAH 1694.2 thousand in agricultural sciences to UAH 17,188 thousand in law. For master’s program graduates in different areas of training, this difference is also insignificant.

When estimating the costs and future benefits associated with education, it is necessary to take into account the time factor and each individual’s alternative opportunities to invest money in order to increase income in the future. In this regard, it is advisable to equate the rate of return on investment in education with the interest rate on deposits, securities, and others, as funds invested in training may increase over time, provided they are placed on bank accounts

To bring the cost of education and future income to a single point in time, the discount rate is used, which is usu-

Dynamics of the average monthly wage of full-time employees by types of economic activity

Type of activity	2014		2017		2020		2021	
	UAH/mon	deviation from the mean	UAH/mon	deviation from the mean	UAH/mon	deviation from the mean	UAH/mon	deviation from the mean
Total	3,480	–	7,104	–	11,591	–	13,648	–
Agriculture, forestry and fisheries	2,556	–924	6,057	–1,047	9,757	–1,834	11,800	–1,848
of which agriculture	2,476	–1,004	5,761	–1,343	9,734	–1,857	11,356	–2,292
Industry	3,988	508	7,631	527	12,759	1,168	14,569	921
Construction	2,860	–620	6,251	–853	9,832	–1,759	11,072	–2,576
Wholesale and retail trade; repair of motor vehicles and motorcycles	3,439	–41	7,631	527	11,286	–305	13,193	–455
Transport, warehousing, postal and courier activities	3,768	288	7,688	584	11,951	360	13,512	–136
land and pipeline transport	3,541	61	7,183	79	11,288	–303	12,881	–767
water transport	3,622	142	7,590	486	12,807	1216	14,366	718
air transport	11,967	8,487	31,088	23,984	21,685	10,094	27,390	13742
warehousing and ancillary activities in the field of transport	4,231	751	8,485	1,381	13,137	1,546	14,574	926
Temporary accommodation and catering	2,261	–1,219	4,988	–2,116	6,026	–5,565	8,393	–5255
Information and telecommunications	5,176	1,696	12,018	4,914	19,888	8,297	24,929	11281
Financial and insurance activities	7,020	3,540	12,865	5,761	20,379	8,788	23,312	9664
Real estate transactions	3,090	–390	5,947	–1,157	8,981	–2,610	10,904	–2744
Professional, scientific and technical activities	5,290	1,810	10,039	2,935	16,613	5,022	18,856	5208
of which research and development	4,268	788	8,212	1,108	12,882	1,291	14,661	1013
Activities in the field of administrative and support services	2,601	–879	5,578	–1,526	9,878	–1,713	10,946	–2702
Public administration and defence; compulsory social insurance	3,817	337	9,372	2,268	16,443	4,852	18,184	4536
Education	2,745	–735	5,857	–1,247	9,271	–2,320	11,514	–2134
Health care and social assistance	2,441	–1,039	4,977	–2,127	8,848	–2,743	11,294	–2354
of which health care	2,463	–1,017	5,023	–2,081	8,995	–2,596	11,494	–2154
Arts, sports, entertainment and recreation	3,626	146	6,608	–496	9,624	–1,967	12,177	–1471
Provision of other types of services	3,361	–119	4,615	–2,489	11,998	407	13,028	–620

ally determined based on the interest rate. Average deposit rates for individuals in Ukraine range from 6.25 to 10.0 % per annum, depending on the amount of deposit, term and type of deposit, the bank. It follows those rational individuals who invest in education can focus on an average rate of return – 8 %. The efficiency of investment in organizing labour potential can be calculated using the annual income formula

$$Y = X \cdot \frac{1 - [1/(1+r)^n]}{r},$$

where Y is total investment (in education, organizing labour potential in general), UAH; X is annual income, UAH; r is discount rate (interest rate); n is the number of years.

It is established that in most areas of training and areas of activity there is a lag in the average wage from the annual (monthly) income, which could be obtained by implementing the alternative of investing not in the formation of human capital of future bachelors and masters, and placement of funds in the banking system (Table 3).

The comparison of cost calculations for labour potential in different areas of activity and official data on the average

Table 2

The cost of organizing labour potential by areas of training and areas of activity, 2021

Field of study	Maintenance expenses for a child under 18 years (UAH thousand)	Expenses for the period of study, UAH thousand		
		Providing life benefits	Education	Total
Bachelor's degree (4 years)				
Philology	1310.4	312	77.95	1700.35
Economy	1310.4	312	74.55	1696.95
Political Science	1310.4	312	73.64	1696.04
Management	1310.4	312	74.86	1697.26
Marketing	1310.4	312	76.40	1698.80
Law	1310.4	312	96.38	1718.78
International relations	1310.4	312	90.65	1713.05
Agricultural sciences (agronomy, horticulture, agroengineering)	1310.4	312	71.75	1694.15
Master's degree (6 years)				
Philology	1310.4	468	77.95 + 48.7	1905.05
Economy	1310.4	468	74.55 + 46.6	1899.55
Political Science	1310.4	468	73.64 + 46.0	1898.04
Management	1310.4	468	74.86 + 46.7	1900.96
Marketing	1310.4	468	76.40 + 47.7	1902.50
Law	1310.4	468	96.38 + 60.2	1934.98
International relations	1310.4	468	90.65 + 56.6	1925.65
Agricultural sciences (agronomy, horticulture, agroengineering)	1310.4	468	71.75 + 44.8	1894.95

Table 3

Annual (monthly) income for future bachelors and masters in various fields of study and areas of activity, UAH thousand

Areas of training and areas of activity	Income for future bachelors		Income for future masters	
	per year	per month	per year	per month
Philology	167.66	13.97	187.84	15.65
Economy	167.32	13.94	187.30	15.61
Political Science	167.23	13.94	187.15	15.60
Management	167.35	13.95	187.44	15.62
Marketing	167.51	13.96	187.59	15.63
Law	169.48	14.12	190.79	15.90
International relations	168.91	14.08	189.87	15.82
Agricultural sciences (agronomy, horticulture, agroengineering)	167.05	13.92	186.85	15.57

monthly wage provides the following periods for return on investment (Table 4).

Table 4

Return on investment in organizing labour potential by sectors of the economy

Areas of activity	Costs for organizing labour potential before employment, UAH thousand	Average monthly salary (2020, UAH)	Return period	
			months	years
Bachelor's program graduates				
Agriculture	1694.2	11356	149	12.4
Industry	1697.3	14569	117	9.7
Construction	1697.0	11072	153	12.8
Trade	1696.7	13193	129	10.7
Transport, warehousing	1697.0	13512	126	10.5
Financial and insurance activities	1697.2	23312	73	6.1
Education	1700.0	11514	148	12.3
Master's program graduates				
Agriculture	1895.0	11356	167	13.9
Industry	1901.0	14569	130	10.9
Construction	1899.5	11072	172	14.3
Trade	1902.5	13193	144	12.0
Transport, warehousing	1901.8	13512	141	11.7
Financial and insurance activities	1900.0	23312	82	6.8
Education	1905.1	11514	165	13.8

The lowest rates of return on investment in organizing labour potential (for bachelor's program graduates) were observed in education (12.3 years), agriculture and construction (12.3 and 12.8 years). As for the periods for return on investment in highly qualified specialists, these are much longer. The period of return on investment in education of specialists engaged in financial and insurance activities in average amounts to 6–7 years.

However, when taking into account various costs in addition to the value of minimum wage (e.g., the cost of paid services during study, educational literature, rental housing for non-resident students, a wider range of food, clothing, footwear, stationery, etc.), as well as the dynamics of prices for goods and services, the period of return on investment in labour potential in the leading sectors of the economy will be much longer [19].

The final stage of the study is to assess the effectiveness of the use of labor potential in the sectoral structure of Ukraine's economy. Calculations show that the highest labor productivity in 2020 was in purely non-productive sectors of the economy: in the field of real estate – UAH 1065.5 thousand per 1 employee, in the field of information and telecommunications – UAH 734.7 thousand, in financial and insurance activities – UAH 627.7 thousand, in the field of public administration and defense – UAH 336.0 thousand.

Labor productivity in industries is UAH 319.2 thousand, in construction – UAH 181 thousand, and in agriculture only UAH 142.7 thousand per 1 employee. At the same time, the share of annual wages in the total volume of domestic product produced in agriculture reached 82.0 %, and approached the level of such areas of activity as education (75.7 %), health care (87.7 %), trade (84.5 %). Thus, the efficiency of the use of la-

bor potential in agriculture, as one of the leading and budget-filled sectors of the country's economy, which ensures its food security, is very low. This is primarily due to the decline in production of many products, low profitability, debt load and weak investment attractiveness of the industry.

Conclusions. It should be noted in summary that in the course of research, we identified the key issues indicating significant contradictions in organizing and fulfilment of labour potential, including quantitative and qualitative needs of Ukrainian sectors of economy in qualified personnel; inefficient fulfilment of labour potential in priority sectors of national economy; unclaimed specialists in a number of professions in the labour market; intersectoral differentiation of wages.

The standard of living of the population and the efficiency of labour potential fulfilment develops as an integrated result of activity of all economic relations subjects. An important prerequisite and a reliable guarantee of further society development is the economic interests' harmonization of economic entities, the working part of the population and other segments seeking to increase the level of personal well-being. Therefore, it is extremely important to substantiate the best ways to stimulate production and develop an effective mechanism for state regulation of social product distribution and redistribution, which will prevent unjustified stratification of population in the future, as well as promote living standards and labour potential efficiency.

References.

- Janshanlo, R. E., Kogut, O. Y., & Czerewacz-Filipowicz, K. (2019). Human capital management trends in the innovative economy of Kazakhstan. *Polish Journal of Management Studies*, 20(2), 267-277. <https://doi.org/10.17512/pjms.2019.20.2.22>.
- Miethlich, B., Kvitka, S., Ermakova, M., Bozhko, L., Dvoryanin, O., Shemshurina, S., & Kalyakina, I. (2020). Correlation of Educational Level, Labor Potential and Digital Economy Development in Slovakian, Ukrainian and Russian Experience. *TEM Journal*, 9(4), 1597-1605. <https://doi.org/10.18421/TEM94-35>.
- Hrivnák, M., Melichová, K., Fáziková, M., & Roháčiková, O. (2019). University graduates, knowledge spill-overs and localization of knowledge intensive ventures-case of post-socialistic country. *Entrepreneurship and Sustainability issues*, 7(1), 146-165. [https://doi.org/10.9770/jesi.2019.7.1\(12\)](https://doi.org/10.9770/jesi.2019.7.1(12)).
- Vergara-Romero, A., Márquez Sánchez, F., Sorhegui-Ortega, R., & Olalla-Hernández, A. (2021). Capital humano: Actor central para la sostenibilidad organizacional. *Revista Venezolana De Gerencia*, 26(93), 297-307. <https://doi.org/10.52080/rvg93.20>.
- Hitka, M., Kucharcikova, A., Starchon, P., Balazova, Z., Lukac, M., & Stacho, Z. (2019). Knowledge and Human Capital as Sustainable Competitive Advantage in Human Resource Management. *Sustainability*, 11(18), 1-18. <https://doi.org/10.3390/su11184985>.
- Antoniuk, V. P. (2020). Problems of employment transformation in Ukraine's industry by technological sectors. *Sociology*, 2(13), 70-85.
- Semikina, M. V., Zapirchenko, L. D., Semikina, A. V., & Bugaeva, M. V. (2020). Development and implementation of the innovative component of human capital based on the improvement of the motivational mechanism in the field of labor. *Central Ukrainian Scientific Bulletin. Economic sciences*, 4(37), 86-100. [https://doi.org/10.32515/2663-1636.2020.4\(37\).86-100](https://doi.org/10.32515/2663-1636.2020.4(37).86-100).
- Grishnova, O. A., & Brintseva, O. G. (2018). Competitiveness of higher education and competitiveness of employees: how is fictitious human capital created? *Labor market and employment*, 1(54), 5-21.
- Libanova, E., Cymbal, A., Lisogor, L., & Iarosh, O. (2016). Labour market transitions of young women and men in Ukraine: results of the 2013 and 2015 school-to-work transition surveys. International Labour Office. Geneva: ILO. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_519747.pdf.
- Mazur, N. (2017). Methods for assessing the effectiveness of the labor potential of the enterprise. *Scientific Bulletin of MNU named after VO Sukhomlinsky. Economic sciences*, 8, 67-71.
- Komarnitska, O. M. (2017). Methodological problems of measuring the labor potential of the enterprise and analysis of modern methodological approaches to its evaluation. *Eastern Europe: Economy, Business and Management*, 3(08), 243-248.
- Harmider, L. D., Taranenko, I. V., Korotka, L. I., & Begma, P. O. (2019). Methodological approach to labor potential assessment based on the use of fuzzy sets theory. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, (6), 144-149. <https://doi.org/10.29202/nvngu/2019-6/21>.
- Hilorme, T., Perevozova, I., Sakun, A., Reznik, O., & Khaustova, Y. (2020). Accounting model of human capital assessment within the information space of the enterprise. *Academy of Accounting and Financial Studies Journal*, 24(3), 1-7.
- Kudina, M. V., & Sukhareva, M. A. (2020). Human capital theory: systematization of approaches based on the criteria for the relationship of its development with structural changes in the world economy. *Intellect. Innovations. Investments*, 5, 59-71. <https://doi.org/10.25198/2077-7175-2020-5-59>.
- Bazaluk, O., Fatkhutdinov, V., & Svyrydenko, D. (2018). The Potential of Systematization of the Theories of Education for Solving of Contradictions of Ukrainian Higher Education Development. *Studia Warminskie*, 55, 63-79. <https://doi.org/10.31648/sw.3062>.
- State Statistics Service of Ukraine (2021). *Official site of the State Statistics Service of Ukraine*. Retrieved from <http://www.ukrstat.gov.ua>.
- Melnik, S. V. (Ed.). (2020). Methodical approaches to the assessment of staffing needs in specialists with higher education in specialties: *monograph*. Kyiv: SRI "Institute of Educational Analytics".
- Petrova, M., Koval, V., Tepavicharova, M., Zerkal, A., Radchenko, A., & Bondarchuk, N. (2020). The interaction between the human resources motivation and the commitment to the organization. *Journal of Security and Sustainability Issues*, 9(3), 897-907. [https://doi.org/10.9770/jssi.2020.9.3\(15\)](https://doi.org/10.9770/jssi.2020.9.3(15)).
- Revin, F. (2021). The Shifting Image of Social Capital: Digitizing Cooperative Ties. *Future Human Image*, 16, 75-82. <https://doi.org/10.29202/fhi/16/7>.

Вартість формування та проблеми ефективної реалізації трудового потенціалу в Україні

С. Г. Черемісіна¹, В. В. Россоха¹, О. А. Петриченко², Л. І. Федоришина³, Н. А. Добрянська⁴

1 – Національний науковий центр «Інститут аграрної економіки», м. Київ, Україна, e-mail: CheremisinaSvitlana@gmail.com

2 – Інститут кормів і сільського господарства Поділля НААНУ, м. Вінниця, Україна

3 – Вінницький національний аграрний університет, м. Вінниця, Україна

4 – Державний університет «Одеська політехніка», м. Одеса, Україна

Мета. Обґрунтувати теоретико-методичні положення й розробити практичні рекомендації щодо організації та ефективного реалізації трудового потенціалу.

Методика. Для проведення наукової роботи авторами використано ряд методів: порівняльного аналізу (при аналізі стану й галузевої структуризації трудового потенціалу), розрахунково-конструктивний (при комплексному дослідженні особливостей формування й реалізації трудового потенціалу), економічного аналізу (для оцінки витрат на формування трудового потенціалу у пріоритетних галузях економіки країни), оцінки ефективності інвестицій у людський капітал (для оцінки окупності витрат на формування трудового потенціалу), методи експертної оцінки (при оцінці пріоритетності галузевих складових економіки), табличний (для наочного зображення отриманих результатів дослідження), абстрактно-логічний (для формулювання висновків).

Результати. Досліджено еволюційний шлях формування категорії «трудоий потенціал». Доведено, що в сучасних умовах соціально-економічного розвитку категорію «трудоий потенціал» доцільно розглядати системно, у поєднанні економічного, техніко-технологічного, інтелектуального, бюджетно-ресурсного, соціального та екологічного складників. Наведене авторське бачення

системного обґрунтування сутності категорії «трудоий потенціал». Досліджено процес формування трудоого потенціалу з позицій теорії людського капіталу та узагальнена класифікація видів інвестиційних вкладень у його формування й розвиток. Проведено комплексний аналіз сучасного стану та виявлені основні проблеми функціонування трудоого потенціалу України. Виявлені негативні тенденції скорочення чисельності найнятих працівників за всіма видами економічної діяльності, поступового зменшення кількості вакансій за багатьма спеціальностями та професіями. Здійснено аналіз і встановлено рівень міжгалузевої диференціації середньомісячного рівня заробітної плати в Україні за період 2014–2021 рр. Встановлені тенденції підготовки фахівців за галузями знань і процес формування їхнього потенціалу.

Наукова новизна. Запропоновано та апробовано методичний підхід до оцінювання умов формування й реалізації трудоого потенціалу, що включає такі методичні прийоми: розрахунок інвестицій у формування трудоого потенціалу; оцінювання ефективності використання трудоого потенціалу в галузевій структурі економіки з урахуванням термінів окупності витрат,

пов'язаних з його розвитком. Оцінена ефективність використання трудоого потенціалу в галузевій структурі економіки України й запропоновані напрями щодо її підвищення.

Практична значимість. Здійснено розрахунок вкладень у формування трудоого потенціалу для ряду пріоритетних галузей і сфер діяльності економіки України. Встановлені тенденції відставання за більшістю напрямів підготовки та сфер діяльності величини середньої заробітної плати від щорічного (щомісячного) доходу, який можна було б отримати за умови реалізації альтернативи вкладень не на формування людського капіталу майбутніх бакалаврів і магістрів, а на розміщення грошових коштів у банківській системі. Результати можуть бути використані як у наукових дослідженнях, так і у практиці менеджменту для управління формуванням трудоого потенціалу в розрізі галузей економіки України.

Ключові слова: *трудоий потенціал, людський капітал, ефективність, окупність, інвестиції, заробітна плата, дохід*

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