ECONOMICS OF DEVELOPMENT
Jornal homepage: https://ecdev.com.ua/
Vol. 20, No. 3
2021

UDC 3378:336.14(477)
DOI: 10.57111/econ.20(3).2021.25-39

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Analysis of the higher education institutions network and the problem of its financing

Abstract. The problem of the quality of specialists training and the issue of financing the training of higher education seekers in Ukraine at the expense of budget funds and the funds of individuals and legal entities are examined. The purpose of the study is to identify ways to increase the efficiency of the use of budget funds to finance the training of students while ensuring the proper quality of this process. During the research, the Data Science toolkit has been used to work with large arrays of Big Data information. In combination with the application of a set of empirical methods, the research enables to put forward a hypothesis about the existence of an irrational distribution of budget funds among higher education institutions (HEIs) to finance the training of students in certain specialties. The article reviews the dynamics of the development of the network of HEIs of Ukraine during the period of independence of state-owned, communal and private forms of ownership and departmental subordination. A comparative analysis of the network structure in relation to the number of higher education seekers has been carried out in comparison with the corresponding structure of the network of educational institutions in European countries and in the USA, which confirms the relevance of the optimization of the network of HEIs and its structure. The presence of artificially created HEIs, which are subordinate to individual ministries and state services with privileged operating conditions, gradually reduces the quality of training in the absence of internal competition, which leads to a gradual decrease in the efficiency of the use of budget funding. The work quantitatively substantiates the state's financial losses from the irrational distribution of the state order among HEIs for the training of specialists with higher education. HEIs with a high proportion of incomplete groups, that are unable to ensure high quality of specialist training, are unable to attract external sources of funding for specialist training as a result of non-competitiveness in the market of educational services, are only spending budget funds without proper results. According to the research results, generalized optimization criteria of the network of HEIs of Ukraine are proposed, which can be used by the governmental bodies of Ukraine

Keywords: state order for the training of specialists, optimization criteria, formation of a special fund, formation of a general fund, use of funds for education, applicants training costs

Article's History: Received: 23.06.2021; Revised: 09.08.2021; Accepted: 21.09.2021.

INTRODUCTION

The desire to enter the world economic space and the globalization processes that exist in the world, do not bypass Ukraine and influence the trends of economic relations. The levelling of barriers, the free movement of capital, the movement of resources of all kinds, the wide spread of digital technologies and artificial intelligence have led to the transformation of the labour market. There is a radical change in the requirements for specialists in various specialties, their competencies, their readiness to work in conditions of rapid changes. New requirements are designed to ensure the proper quality of specialist training. Providing the labour market with in-demand highly qualified specialists, who meet not only modern requirements, but are also ready to work in the conditions of a new type of economy, is one of the important tasks of the state government.

Suggested Citation:
Pysarchuk, O. (2021). Analysis of the higher education institutions network and the problem of its financing. *Economics of Development,* 20(3), 25-39.

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The training of specialists is carried out through an educational network, which includes different levels of educational institutions, a heterogeneous structure of subordination and financing of educational activities. The existing discrepancy between the demand for specialists of certain specialties and the requirements for them, the offers available on the labour market, the discrepancy between the level of training and the unwillingness to actively participate in the economic relations of a certain number of graduates of HEIs (higher education institutions) after receiving diplomas, indicate the need for an urgent solution to the specified problem. The inability of some HEIs to respond promptly to modern challenges, to the change of the environment, and inability to provide high-quality training of specialists determines the need to reorganize their activities. The effectiveness of the educational system of Ukraine is determined by a combination of factors. On the one hand, the results must be evaluated. How quickly graduates are included in active economic relations, in the processes of creating GDP (gross domestic product), how well they meet the modern demands of the economy, how quickly they can adapt to changing conditions, what positive effect they can create for the economy. On the other hand, the cost component is evaluated, namely, what resources and in what amount were spent to achieve the specified effect. It is the optimal ratio of spent resources and the obtained result that becomes the basis for determining the efficiency of resource usage. The presence of disproportions in the labour market in combination with constant requests to increase the amount of funding determines the need to optimize the network of HEIs of Ukraine. Taking into account the world trends regarding the creation of large scientific and educational centres, the merger of universities [1], while preserving a group of small institutions with specific, unique features, it is advisable to consider the main directions of optimization of the network of HEIs of Ukraine, including those caused by their merger.

In modern conditions, the study of higher education financing is of particular relevance. The main sources of funding for the activities of HEIs of Ukraine are budget funds through the general fund, as well as funds from individuals and legal entities that fill the special fund. In the work of O. Komarova [2], an analysis of the amount of state financing of education was carried out in terms of different levels of training, namely preschool, general, vocational and higher education. The author proved the low level of financing education costs in the structure of GDP, as well as in the structure of general budget expenditures. In conditions of underfunding of education, O. Komarova [2] used the concept of "survival budget", which almost excludes opportunities for development. However, in the studies, emphasis is placed on the need to increase state allocations for education in general, on the need to comply with legally recognized requirements regarding the share of education costs. But the problem of effective distribution of available funds and identification of the reasons for the irrational distribution of state funding has not been carried out. The search for optimal models of financing higher education is relevant for scientists from different countries of the world. The paper presents the results of the impact on the development of higher education as a whole, changes in mechanisms of state funding and principles of allocation of funds. F. Huang [3] cited the experience of Japan, where the interaction between national, regional educational institutions and central authorities has been transformed. N. Van Long [4] insisted on the expediency of using a model of government loans that depend on ICLs (income contingent loans) to finance higher education. The proposed funding model is used in the Australian co-financing system for education, as there is actually a sharing of risks between the private and public sectors. The model considered in the study is actually an element of lending. A. Edmund [5] investigated the relationship between state support of educational institutions and their positioning in global rankings, citing the lack of a clear direct relationship for the studied HEIs of European countries between their positioning in global rankings and the amount of state funding. Thus, confirming the hypothesis regarding the expediency of finding an individual model of financing education for each country, depending on regional characteristics. Investigating the relationship between the rating positioning and the amount of funding, issues regarding the quality of specialist training and the effectiveness of the use of financial resources were neglected.

The purpose of the study is to carry out a meaningful analysis of the existing structure of the network of HEIs of Ukraine, to study the peculiarities of financing educational institutions for each of the segmented groups of HEIs; to identify the problems of financing education and to find ways of improving the efficiency of the use of state budget funds for financing education with the provision of high-quality training of students.

MATERIALS AND METHODS

A wide range of Data Science analysis tools were used during the research. Data aggregation was applied to conduct research based on official data of the State Statistics Service on the population of Ukraine [6] for the period 1992-2020, and indicators on Higher Education in Ukraine [7], namely the number of educational institutions according to the classification of the State Statistics Service. The array of data of the Unified State Electronic Database on Education (USEDE) by years, regarding the contingent of higher education seekers [8], the results of admission to HEIs [8], information on registered HEIs [9] was processed using a set of approaches and methods that apply Big Data to process structured and unstructured information. Tabular and graphic methods were used to visualize the obtained results of information analysis. The application of comparative analysis methods in combination with statistical research made it possible to formulate generalized indicators of the number of educational institutions per person of the population of Ukraine, based on the calculated indicators of European countries. Methods of economic-mathematical analysis of financial and statistical reporting of the activity of HEIs of Ukraine, including a set of calculation and analytical methods were used. Through the methods of grouping, groups of HEIs were formed. The application of methods of analysis and synthesis became a toolkit for segmentation within each of the groups of HEIs.

The results of research conducted within the framework of the European University Association (EUA) were also used [10]; according to the results of the implementation of the DEFINE project [11] regarding the practice

of university mergers in European countries. Along with this, data from the European Register of Higher Education were involved for the analysis of European experience [12]. The criteria for the distribution of HEIs by size, which are proposed in [10], depending on the contingent of higher education seekers, namely, up to 500 students; from 500 to 20 000 students, from 20 000 to 50 000, and more than 50 000 students were taken as the basis for the grouping of HEIs of Ukraine, with an adjustment for the fact that today there are no HEIs in Ukraine with a contingent of more than 50 000 students. Therefore, all institutions with a contingent of more than 20 000 students are classified as large HEIs.

Financial reporting data of HEIs of Ukraine, published on the official websites of educational institutions about the receipt and use of funds from the general fund and the special fund under the budget program "Training of personnel by institutions of higher education and ensuring the operation of their practice bases", was used to calculate the receipt of the general fund per student for each of the HEIs, calculation of the sums of funds raised from external stakeholders, incoming sums to the special fund per student. Also, the mentioned data on vocational education and training made it possible to rank educational institutions according to their ability to independently attract external sources of funding for training through the calculation of the amount of income to the special fund per hryvnia of funding from the general fund. In fact, this indicator provides an opportunity to assess the effectiveness of the use of state budget funds that go to the general fund of HEIs.

RESULTS AND DISCUSSION

During the years of an independent state establishment, a network of HEIs was formed in Ukraine. During this time period, the structure of the network of educational institutions, their form of ownership, and subordination changed significantly. The transformation of priorities and attitudes in society to educational processes led to changes in the structure of the network of educational institutions and its quantitative indicators. In 1994-1998, the number of institutions with the status of "institution of higher education" grew rapidly, and private HEIs were opened. In the study [13], it is indicated when a hundred or even more HEIs were created within two years. Figure 1, according to data [7], shows the dynamics of the structure of the network of HEIs for the period 1991-2020 and the number of higher education seekers studying in the respective institutions.

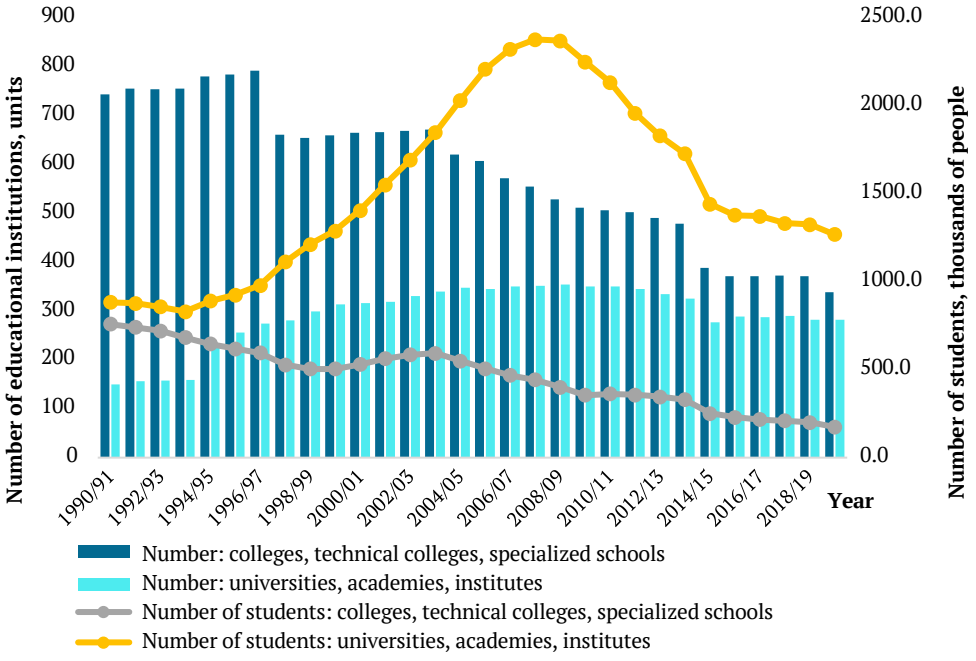


Figure 1. Dynamics of the number of educational institutions and their students
Source: built by the author based on data [7]

The number of colleges, technical schools, specialized schools had a tendency to fall, from almost 800 units in 1996, it decreased more than 2 times in 2019. The number of universities, academies, on the contrary, had a tendency to grow. Whereas since 2014/2015, their number is gradually decreasing. At the same time, the population of Ukraine during the period of independence tended to decrease from more than 52 million people in 1993 to less than 42 million people in 2020. The study of modern trends in migration processes, the expansion of opportunities for the movement of resources of all kinds, the levelling of borders, taking into account the steadily high rates of population decline in Ukraine, give reasons to assume the continuation of such a trend of population decline. One of the defining features of the present-day is the active development of digital technologies, which are gradually being introduced into all spheres of life. Restrictions that were applied as a measure to prevent the spread of the COVID-19 pandemic, on the one hand, led to negative consequences, significant economic losses, a drop in socio-economic activity, on the other hand, gave a new impetus to the development of remote

technologies and their application in various spheres of socio-economic relations, including the educational process. Digitization processes put forward new requirements, both for HEIs regarding the level of provision and implementation of the educational process, for technical equipment, personnel support, and for the higher education system as a whole.

Taking into account the indicated trends, a problem of ensuring the compliance of HEIs of Ukraine, their quantitative and substantive parameters, with the modern requirements of the economy and the needs of society arises. Globalization processes, the acceleration of integration of the higher education system of Ukraine into the world educational space, necessitates the transformation of the education system, taking into account the main European trends and guidelines, under the conditions of ensuring high quality of education. The indicators of the average number of the population per HEI and the average number of students per HEI in different countries of Europe and the United States are informative. Table 1 demonstrates the need to optimize the quantitative parameters of the network of HEIs in Ukraine.

Table 1. Average indicators of "coverage" of the HEIs network in different countries

Indicator	USA	Germany	France	Ukraine
Number of population, persons	331 893 745	83 237 124	67 626 396	41 902 000
The number of students, persons	19 637 000	2 945 000	1 935 800	1 183 207**
Number of HEIs, units	3982	422	331	335*
Calculated indicators				
Coverage level (the average number of population per HEI), persons	83 348.50	197 244.37	204 309.35	124 708.33
The average number of students per HEI, persons	4 931.44	6 978.67	5 848.34	3 521.45

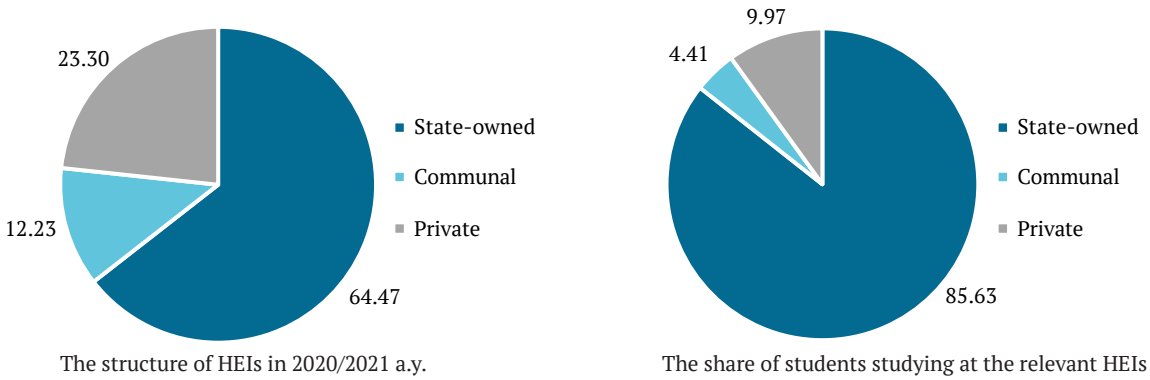
Note: * – without taking into account educational institutions where training of cadets, conscripted for military service is conducted according to the data of USEDE; ** – without taking into account the contingent of cadets of military institutions according to the data of the USEDE

Source: developed by the author based on [6; 8; 12; 14-16]

According to Table 1, the average number of students per HEI in Ukraine is lower than in other countries. Such a situation is due, on the one hand, to an excessive number of HEIs, and on the other hand, a significant share of small institutions with a small contingent of applicants, but which have been granted the status of "institution of higher education". The indicator of the estimated number of population per HEI is also lower than in European countries. The issue of optimizing the number of HEIs in Ukraine becomes urgent. In the future, the average number of students per HEI should be brought up to at least 6 000 people, and the average number of population per HEI to 200 000 people, which will correspond to the average European indicators. However, the calculated indicators are averaged. Their use can only be a guideline for each region. In order not to destroy the system of higher education in Ukraine, it is necessary to systematically and carefully approach the solution of the specified problem, taking into account the strategic needs of Ukraine, the characteristic features of the higher education network and regional characteristics.

The study of networks of HEIs of European countries and the USA showed a variety of systems, features for each of the countries, and at the same time allowed to identify certain trends. Merger processes are one of the areas of optimization of the HEIs network. The processes of merger of HEIs take place in different parts of the world, in European countries, Asian countries, the USA with different intensity and scale of implementation. In Europe, the process of consolidation of HEIs through mergers has been going on for many years. In the research "University mergers in Europe" of the European University Association (EUA) [11], which was carried out as part of the DEFINE project, it was determined that over the past two decades there have been more than 130 mergers with more than 2100 HEIs in 22 European countries, which is about 6%. As part of the implementation of this project, an interactive "mergers map" [17] was built, which provides information on mergers both by individual countries and the dynamics over the past 20 years. The results of the analysis show that in different countries the process of transformation of the network of HEIs is extremely uneven, both in terms of time and quantitative characteristics. There are countries with only 1 merger each, such as Italy and Portugal, and countries with more than 10 mergers, such as Greece and Norway. Similarly, there are significant differences in the percentage coverage of HEIs that have undergone transformation. The share of such HEIs ranges from 0.5% in Italy to 77.8% in Estonia of the total number in the country. The greatest peak of mergers of private and public institutions in European countries occurred in 2013-2015. In three years, 37 mergers took place. However, since 2016, this process has slowed down significantly and the number of mergers did not exceed 4 per year. From 2003 to 2012, a fairly stable situation was observed, the number of mergers ranged from 5 to 8.

Optimizing the network of HEIs of Ukraine is an objective necessity, but the process must be balanced and gradual. The network of HEIs is not homogeneous, its elements are institutions of different subordination, forms of ownership and with different sources of financing. Figure 2, according to the data of the State Statistics Service [7], shows the distribution of HEIs of Ukraine at the beginning of the 2020/2021 academic year by forms of ownership in comparison with the share of students studying at such HEIs.



The structure of HEIs in 2020/2021 a.y. The share of students studying at the relevant HEIs

Figure 2. Distribution of HEIs by forms of ownership and the share of students for 2020/2021 a.y.
Source: created by the author

According to data [7], state-owned institutions make up 64.47% of the total number of HEIs in Ukraine and cover more than 85% of education seekers. While less than 10% of higher education seekers study at private HEIs, the share of which is 23.3% in the total number of HEIs. Less than 4.5% of students study in communal educational institutions (12.23% of the total number). This distribution shows that education seekers traditionally prefer state-owned institutions, despite the high rate of opening of private HEIs. Traditions, material and technical base, scientific schools, image play a decisive role in choosing an educational institution. It is necessary to take into account the fact that HEIs in Ukraine have different founders, both public and private, and different departmental subordination. The structure of the HEIs network for 2021 is presented in Table 2.

Table 2. Structure of the network of state-owned HEIs by departmental subordination

№	group	Departmental subordination of state HEIs	Number of HEIs
1	I	Ministry of Internal Affairs of Ukraine	8
2		Ministry of Defence of Ukraine	3
3		Security Service of Ukraine	1
4		Administration of the State Border Service of Ukraine	1
5	II	The State Emergency Service of Ukraine	3
6		Ministry of Health of Ukraine	16
7	III	Ministry of Education and Science of Ukraine	152
8	IV	Ministry of Foreign Affairs of Ukraine	1
9		Ministry of Environmental Protection and Natural Resources of Ukraine	1
10		Ministry of Culture and Information Policy of Ukraine	13
11		State Statistics Service of Ukraine	1
12		Ministry of Social Policy of Ukraine	1
13		Ministry of Finance of Ukraine	1
14		Ministry of Justice of Ukraine	1
15		National Academy of Sciences of Ukraine	2
16		National Academy of Pedagogical Sciences of Ukraine	1

Source: built by the author based on data [9]

In Table 2, ministries and departments are grouped as follows. Information on HEIs, which are subordinate to the ministries and state services of the I group, is not public and has strict restrictions on publication. HEIs, which are assigned to the II group under departmental subordination, partly have civilian specialties, but there are also certain restrictions on the disclosure of information in full. HEIs under the Ministry of Education and Science of Ukraine belong to the III group. The IV group includes HEIs that are subordinate to ten other ministries and state services. Only 45% of the total number of HEIs are under the supervision of the Ministry of Education and Science of Ukraine. State-owned HEIs are subordinated to 16 ministries and state services, on the one hand, this is aimed at specialized training, and on the other, it significantly disperses state budget funds for the training of specialists with higher education, especially in non-specific specialties. Communal institutions of higher education are subordinated to and, accordingly, receive funding from the general fund through regional councils, city councils and regional state administrations.

The structure of subordination and forms of ownership of institutions of vocational education (VE) and vocational-technical education (VTE) are somewhat different. According to data [8], the share of state institutions is

51.9%, in turn, only 34% of VE institutions are subordinated to the Ministry of Education and Science of Ukraine. The share of such institutions of communal form of ownership is almost 40% compared to 7% of communal institutions in the structure of the HEIs network. Funding of general fund revenues occurs due to the redistribution of the educational subvention of the state budget, as well as local budgets. Less than 10% of VE institutions belong to privately owned institutions. Similarly, as for vocational training, there is a wide differentiation of departmental subordination of vocational training institutions, which also leads to dispersion of budget funds and inefficient placement of state orders.

Solving the problem of optimizing the network of HEIs in Ukraine cannot be achieved only at the level of the Ministry of Education and Science of Ukraine. The problem requires a comprehensive approach and finding ways at the level of the Cabinet of Ministers of Ukraine. The optimization criteria must be uniform for all HEIs that receive funds from the general fund (GF) of the State Budget (SB). An exception may be departmental HEIs, which train specialists with higher education exclusively in specific specialties that correspond to the profile of the relevant department. Their number and size should be justified within the framework of these departments. These are HEIs, which according to Table 2 are assigned to groups I and II.

65.8% of state-owned HEIs under the supervision of the Ministry of Education and Science of Ukraine are in the structure of state-owned HEIs. In such a situation, the question arises of the expediency of maintaining HEIs, which are subordinate to other ministries and departments (group IV) and conduct training in specialties that are in the system of HEIs of the Ministry of Education and Science of Ukraine. In fact, the maintenance of the said HEIs is carried out at the expense of the state budget, and the receipt of funds to the general fund occurs through other managers of budget funds. In general, according to data [8], as of October 1, 2020, outside the sphere of management of the Ministry of Education and Science of Ukraine and outside its subordination, there are 106 private HEIs, 23 communal HEIs and another 54 state-owned HEIs operating in Ukraine, which is almost 55%. In fact, the Ministry of Education and Science of Ukraine is limited in its influence on more than half of the institutions of the higher education network.

The structure of the HEIs network is heterogeneous not only in terms of ownership and subordination, but also in terms of the size of educational institutions, depending on the number of students. As part of the research conducted by the association of European universities EUA, on the basis of the data of the European Register of Higher Education (ETER) [18], groups for the distribution of HEIs by size are given [12]. In accordance with this classification, the distribution of Ukrainian HEIs was carried out. Figure 3 shows a diagram of the distribution of European HEIs in comparison with the distribution of Ukrainian HEIs by the number of education seekers.

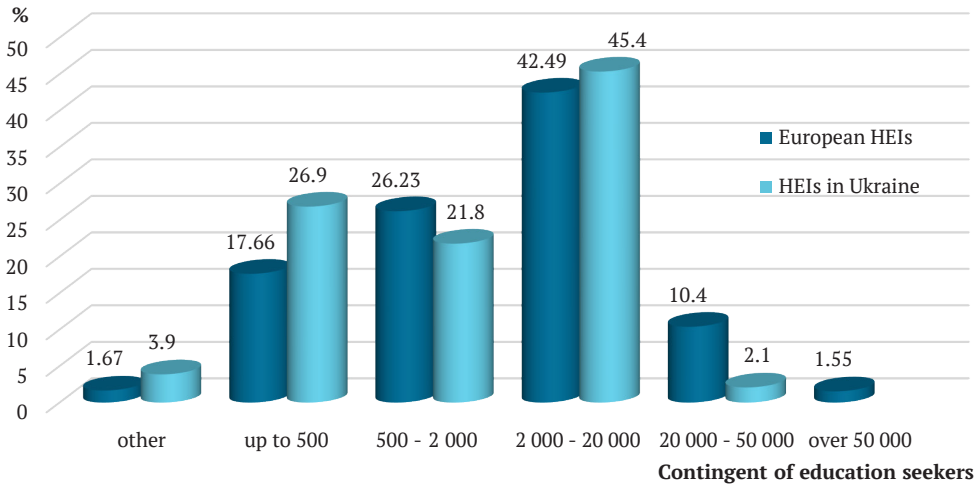


Figure 3. Structure of the network of European and Ukrainian HEIs by the number of education seekers
Source: created by the author

The structure of the network of Ukrainian HEIs in terms of the number of students generally corresponds to the structure of European HEIs. However, according to some groups there are certain differences. In the category of others, Ukrainian HEIs, which are included in the I group under departmental control (Table 2), because a correct assessment of the number of applicants of such HEIs is impossible due to restrictions on the publicity of data of these higher educational institutions. The percentage of average HEIs with a contingent of students from 2 000 to 20 000 is almost the same and is 45.4% in Ukraine, against 42.49% in Europe. Among middle-sized HEIs, the number of private ones is small, only 6 institutions. The fundamental differences in the comparison of the structures of higher educational institutions networks are the fact that there are no higher educational institutions with a contingent of more than 50 000 students and a small share (2.1%) of HEIs with a contingent of 20 000 to 50 000 students.

The share of institutions in the category with the number of up to 500 students significantly exceeds the similar indicator of European HEIs. The vast majority of small HEIs are private HEIs (74.4% in this category). Thus, the main financial burden for ensuring the functioning of HEIs of this group falls on non-state sources of functioning. In the category with students' number from 500 to 2 000, the share of privately owned HEIs is 30%. It is objec-

tive that the Ministry of Education and Science of Ukraine does not exert organizational influence on private HEIs regarding the optimization and adjustment of their sizes. Ensuring effective activity, attracting and using funds is the prerogative of private owners. Taking into account the fact that Figure 3 shows the distribution of all private educational institutions, regardless of the forms of ownership and sources of their financing, it is appropriate to separately consider private educational institutions that receive budget funds for the implementation of their activities. Figure 4 shows the distribution of HEIs by the number of education seekers of communal and state ownership without taking into account specific HEIs, which are assigned to the I group of departmental subordination (Table 2).

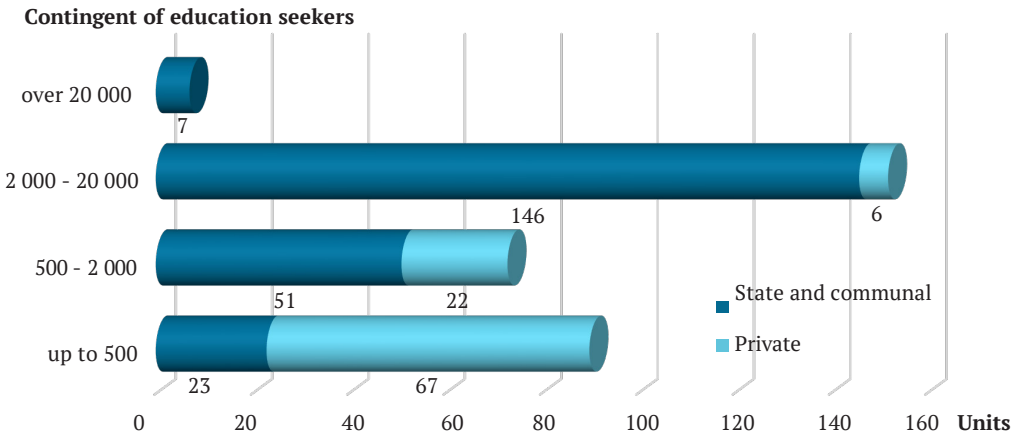


Figure 4. Diagram of the distribution of HEIs of Ukraine according to the volume of the contingent of education seekers and the form of ownership

Source: created by the author

According to [8], there are 227 state-owned and communal HEIs in Ukraine, of which 74 are small (with a contingent of up to 2 000 students) (32.6%). The number of medium-sized HEIs with a contingent of 2 000 to 20 000 students is 146 (64.3%). The number of large HEIs with a contingent of more than 20 000 students is 7 (3%). The problem of small HEIs, the contingent of which is less than 2 000 students, needs to be solved. These are 74 institutions of communal and state ownership and 89 institutions of private ownership. The number of such establishments must be reduced to a minimum. HEIs with a contingent of up to 500 people training at the "Bachelor" educational level for 4 years have about 100 students in each course, and these are only 4 academic groups. There are questions about the number of specialties and educational programs for which training is carried out, the number of students in each educational program and the number of years of training; staff support, financial support for the implementation of educational activities at the appropriate level, and as a result, the quality of specialist training.

In the conditions of a systematic decrease in the amount of financing of state budget expenditures on education, the question of the most effective use of budget funds for the training of specialists is becoming more acute. Among the directions of cost optimization, the direction of optimization of the HEIs network is highlighted. The implementation of the model of optimization of the HEIs network should be balanced and should take into account the peculiarities of each region. Considering the total number of small HEIs (163), optimization and merger of them at this segment is inevitable. Formation of the parameters of the optimization model of the HEIs network, along with other aspects, should take into account the following aspects, namely: territorial and geographical location; the list of specialties for which training is conducted; availability of the specified specialties in other HEIs of the relevant region; elimination of duplication of specializations for the training of specialists if it is possible to meet the needs of society with a smaller number of HEIs. This will provide an opportunity to carry out optimization in the middle of this segment without significant losses for the region. Due to the redistribution of educational subvention funds among educational institutions for the financing of activities, the possibilities of additional financing of their development are expanding, and funds from the state and local budgets will be released. On the other hand, there are certain HEIs, regardless of their size, which, from a statesman's point of view, must be left for the realization of some specific goal. For example, the preservation of a cultural centre, since HEI is a forming city one. Or they train specialists with higher education for special, unique specialties that are not trained in medium-sized and large HEIs.

Another group of HEIs where there are significant differences between the European and Ukrainian networks is the group with a contingent of education seekers of more than 20 000 people. In the European network of such HEIs, 12% make up, while in Ukraine they are only 2.1%. This group of HEIs should be considered in more detail. The group includes 7 HEIs: Ivan Franko Lviv National University; National Aviation University; National Technical University of Ukraine "Ihor Sikorsky Kyiv Polytechnic Institute"; National University of Bioresources and Nature Management of Ukraine; Kyiv National University named after Taras Shevchenko; Kyiv National University of Trade and Economics; Lviv Polytechnic National University. Involvement of external stakeholders in the financing of educational activities becomes the basis for filling the special fund (SF) of higher educational institutions and a source

of financing development costs [13]. Today, a significant number of HEIs provide training for each specialty. Therefore, students and their parents always have a choice which educational institution to study at and whom to pay. The amount of funds raised from external sources becomes an indicator for the educational institution regarding its image, the quality of training, priorities regarding the effectiveness of the work of the higher educational institution staff. The indicators of attracting funds to the SF become an indicator for the management bodies of higher educational institutions regarding the effectiveness of the management of the educational institution and the ability to attract external sources for co-financing. In the conditions of limited budget funding, the factor of readiness and ability of HEIs to independently ensure development and ensure compliance with the most modern requirements is an important aspect.

The level of the indicator of the amount of revenues to the special fund per hryvnia of revenues to the general fund shows how much the HEI independently attracts financial resources for each invested hryvnia of budget funds. According to the group of large HEIs, this indicator is within 0.5, except for the Kyiv National University of Trade and Economics (KNUTE) (1.85), i.e., on average, HEIs attract from external sources within 50 kopecks for each hryvnia of budget funding. And for the National Technical University of Ukraine "Ihor Sikorskyi Kyiv Polytechnic Institute" this indicator is the lowest and is 0.23. The average amount of income to the SF for 1 scientific and pedagogical worker is UAH 237 726 precisely due to the high indicators of KNUTE.

Solving the problems of financing higher education through the optimization of the network should focus not only on quantitative indicators, such as average values for the region or country, but also be based on indicators that ensure the achievement of the strategic goals of the country's development. Therefore, simple merger of HEIs cannot become a solution to the problem. In the first place should be the criterion of the possibility of potential improvement of the quality of training of specialists with higher education in certain specialties and the corresponding preservation of established, effectively operating scientific schools. Not less important is the criterion of reducing the costs of the general fund of the state budget under the budget program "Training of personnel by institutions of higher education and ensuring the operation of their practice bases" [19], [20]. The complexity of solving this problem is due to the peculiarity of the network of HEIs, given the dispersion of budget funding of state-owned and communal educational institutions, which is actually carried out through different administrators of budget funds. A wide list of management bodies to which the HEIs are subordinate and which are their founders leads to situations of artificial creation of HEIs. 8 departments have only 1-2 HEIs under their control, each of which functions outside of a competitive educational environment. This situation leads to a gradual decline in the quality of education, the lack of internal development incentives, uneven funding as a result of the receipt of funds from different managers.

From the point of view of optimizing expenditures from the State Budget of Ukraine for the maintenance of HEIs and the organization of educational activities (according to the budget program 2201160 "Training of personnel by institutions of higher education and ensuring the operation of their practice bases") [20], it is important to separately consider state HEIs, which are subordinate to the Ministry of Education and Science of Ukraine (Fig. 5).

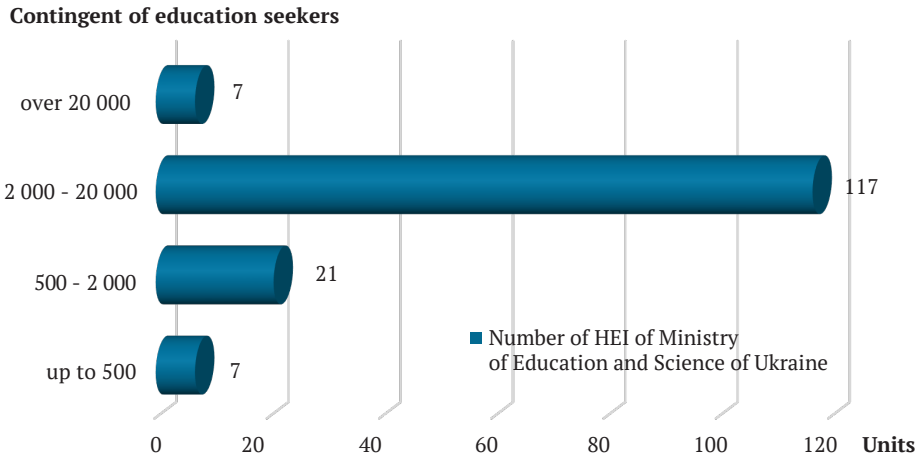


Figure 5. Distribution of HEIs subordinated to the Ministry of Education and Science of Ukraine according to the contingent of education seekers

Source: created by the author

According to the European classification, it is medium-sized HEIs with a contingent of 2 000 to 20 000 education seekers that occupy the main share, almost 77%, in the network of HEIs subordinated to the Ministry of Education and Science of Ukraine. The maintenance of state-owned HEIs is carried out at the expense of the state budget through receipts to the general fund, as well as by attracting sources of external funding through receipts to the special fund from external stakeholders. Indicators of the level of attraction of external funding are among the criteria for the effectiveness of the management of HEIs. In accordance with the Decree of the Cabinet of Ministers of Ukraine (CMU) [21], the formula for the distribution of State budget expenditures among

institutions of higher education under the program "Training of personnel by institutions of higher education and ensuring the operation of their practice bases" contains indicators of the amount of funds received by the special fund based on the results of scientific activities, results of international activity, the coefficient of scale of activity, which depends on the contingent of students. According to the indicator of attracting funds to the special fund per hryvnia of general fund revenues, the following results are observed.

For the group of large HEIs with a contingent of more than 20 000, the value of the indicator, as noted, is 0.6 on average for the group. For the group of small HEIs with a contingent of up to 2 000, the indicator was 0.55. For each hryvnia of budget funding, institutions attract 55 kopecks from external stakeholders. According to the group of medium-sized HEIs with a contingent of 2 000 to 20 000 people, for 117 HEIs, this indicator by group was 0.68 on average. That is, on average, for each hryvnia of budget funding, the institution of higher education received 68 kopecks from external sources. The discrepancy between the minimum – 0.13 and the maximum – 2.7 value of the indicator in the group of medium-sized HEIs indicates the heterogeneity of the HEIs network and the noticeable difference in the management of them. 10 HEIs groups have an indicator of less than 0.3; the level of the indicator from 0.3 to 0.5 is in 46 HEIs groups; 36 HEIs have an indicator in the range from 0.5 to 1.0; only 21 HEIs attract funds from external stakeholders to the special fund more than they receive budget funding to the general fund, for them this indicator is between 1.01 and 2.7. Optimization of financing of higher education through the optimization of the network of HEIs, in combination with increasing the efficiency of the use of budget funds, should be based on a set of indicators, including the ability of HEIs to attract funds to a special fund from external sources.

It is obvious that medium-sized HEIs not only more effectively use the funds of the general fund of the state budget, but also more actively attract funds from external stakeholders, adhere to a more flexible financial and economic policy. The argument that the exclusivity of this situation is due to the fact that medium-sized HEIs train specialists in more popular specialties than large ones is not justified, since in Ukraine any HEIs has an opportunity and accredit a set of those specialties that they consider necessary at their own choice. Therefore, the more effective use of the funds of the general and special funds of the state budget by medium-sized HEIs largely depends on the quality of management of the relevant HEIs. On the basis of reporting information on the receipt and use of budget funds by HEIs under the budget program 1160 "Training of personnel by HEIs and ensuring the operation of their practice bases", the average amount of higher education income from the general fund per student for each group of small HEIs, medium-sized and large was calculated (Fig. 6), depending on their size.

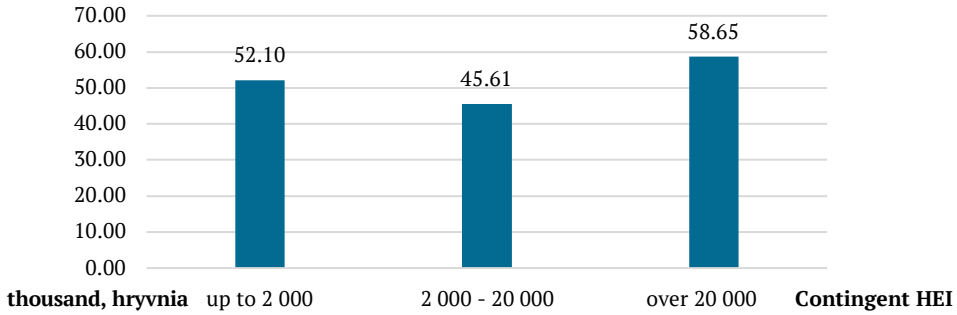


Figure 6. The average level of expenditures of the general fund per higher education seeker by groups of HEIs
Source: created by the author

A comparison of the absolute values of incomes of HEIs according to the general fund for different groups of HEIs cannot be informative and provide an adequate result. Only comparable given values can be the basis for further evaluation of the use of funds. The most expensive for the state budget turned out to be the maintenance of large HEIs, with a quota of more than 20 000 students. The average costs per student in this group are more than UAH 58.65 thousand. Maintenance of small HEIs is carried out at the level of UAH 52.1 thousand per student. Whereas the expenditure of budget funds for the financing of medium-sized HEIs by UAH 13.000 below the large ones. Revenues of the general fund of such HEIs on average for the group amount to UAH 45.61 thousand. Funding under the program "Training of personnel by institutions of higher education and ensuring the operation of their practice bases" per student of large institutions is almost a third (28.6%) higher than the funding of medium-sized HEIs. The given calculations prove the following. The existing hypothesis about the feasibility of optimizing the network of HEIs through their merger, creating only large HEIs, will help save public funds, optimize the costs of maintaining higher educational institutions and contribute to improving the quality of education, is not proven, neither from a financial point of view, nor from a statement about the effectiveness of the result in terms of quality education, nor from the position of solving social problems.

Equally important in the process of optimization of the network of HEIs is the socio-economic criterion. It is necessary to preserve HEIs in those cities where they are city-forming, because they support the appropriate educational and historical-cultural level of the population in these cities and play an important role in the formation of the economic component of their development. The decision to preserve and even increase the number of young people in regions that are of strategic importance in the

political and economic aspect, including border regions, is well-founded. Returning to the quality of training of specialists with higher education, it must be decided who and how evaluate this quality in a specific specialty. There is a widespread thesis that the inclusion of HEIs in certain international ratings ensures the high quality of specialist training. However, the analysis of the structure and weighting coefficients of the indicators taken into account in these ratings shows that they are irrelevant to the specialties for which competent specialists are formed in a particular HEI. The entry of HEIs into one or another rating is not a guarantee of the quality of training in each of the specialties, especially in the current period of time. More informative is the external stakeholders' assessment of the quality of training of specialists with higher education in a certain specialty at a specific HEI. Employers and applicants with their parents act as such stakeholders, who evaluate the attractiveness of HEIs and the quality of education by their choice of HEIs and their own funds when enrolling in a contractual form of education. If the HEI has an order from employers for the development of scientific and project solutions in a certain field of knowledge, has an order from them for the training of specialists in a specialty related to this field, this can be an evaluation characteristic of the quality of training of specialists with higher education. Similarly, the measuring evaluation of the quality of training of specialists is the number of applicants to the contract form of training at the corresponding HEI in a specific specialty under the conditions of dumping restrictions.

The state also acts as an external stakeholder in relation to the activity of a HEI. On the one hand, due to a set of restrictions, on the other hand, due to relevant orders, the state significantly influences the activities of educational institutions. It formulates its priorities in the form of a state order for the training of specialists with higher education. However, unlike the stakeholders of business entities and individuals, it evaluates the quality of training of specialists in a specific HEI indirectly through the allocation of funding in accordance with the Resolution of the CMU [21] regardless of specialties. The existing financing system assumes that the state finances the training of even one specialist in a certain specialty in a separate HEI. It is clear that the quality of such training cannot be high due to lack of funding. This amount of funds per applicant (Fig. 6) is not enough even for salaries with accruals to scientific and pedagogical workers, therefore there is no question of development. The specified problem is closely related to the formation of parameters for the effective distribution of state orders based on a wide competition. In the process of forming a list of HEIs that have the right to receive a state order for a certain specialty, it is necessary to take into account the history of recruitment of a specific HEI for a certain specialty or educational program during the previous two to three years.

If, during the studied period of time, the relevant specialty or educational program of the first bachelor's level of HEI does not enrol a sufficient number of students, taking into account those who study under the state order, as well as students who study at the expense of individuals or legal entities, then there is a high probability of a repetition of a similar situation in the current year. The trend of extremely low popularity among applicants of the relevant specialty in a certain HEI may be preserved. As a result, for several years in a row, according to a certain educational program, the training of students in the so-called incomplete groups is carried out under conditions of underfunding. A direct negative consequence of such a situation is the impossibility of providing educational services at a high-quality level. Since the financing of the training of higher education seekers has two sources, budget funds and funds of individuals or legal entities. The formulaic approach to the distribution of funds from the general fund of the state budget among institutions of higher education involves adjusting the amount of funding taking into account a set of indicators, among which there is a contingent of seekers. The amount of funds that the educational institution receives as income to the special fund from individuals and legal entities depends on the amount of the contract. The low popularity of a certain specialty limits the possibility of increasing the amount of tuition fees for the funds of individuals and legal entities. In total, the reduced volume of funding from the general and special fund leads to underfunding of the process of training specialists. As a result, this HEI will not be able to provide high-quality training for education seekers, and as a result, this is an inefficient use of budget funds. The state does not receive high-quality specialists, which means that this is an irrational distribution of the state order for the specialists training.

In case if the situation with an incomplete group is not an isolated problem for a certain HEI, objectively there is a need to cover the minimum necessary costs for the students training, including the salary of the scientific and pedagogical workers. There is a conditional internal redistribution of funds. The financial resources received by the HEIs for the students training for other specialties, both from general and special funds, will be partially used to cover costs due to underfunding of incomplete groups. Depending on the amount of such overlap of costs, there is a situation of actual underfunding of training in other specialties. Accordingly, the quality of the training of specialists is low, which means the inefficient use of budget funds, which are directed not only to financing the training of education seekers from incomplete groups, but also to the training of students in other specialties. Gradually, the problem takes on a progressive character. The importance of this problem is confirmed by the number of expenditures from the general fund for the training of specialists with higher education, which was approved for 2021.

According to the data of the admission results in 2020, which are given in the USEDE [8], an analysis of the efficiency of the distribution of state-ordered places among HEIs according to the relevant specialties was carried out. When making calculations, the following assumption was applied. The threshold for the number of education seekers who are enrolled in studies with the funds of the state budget and the funds of individuals and legal entities is 15 people. A group with a smaller total number of education seekers is considered incomplete, regardless of the ratio of the number of education recipients in it by funding sources. Allocation of budget funds from the general fund to finance the training of students for incomplete groups is an inefficient use of budget funds from the general fund of the budget. Sources of funding for the training of specialists

are state and private funds. Even if only 1 student studies under the state order, and the other 14 – with the funds of individuals and legal entities, the author of the study believes that in total, such revenues from the general fund and the special fund ensure the implementation of expenses for the training of specialists. In authors opinion, the use of state budget funds is effective.

The smaller number of education seekers does not ensure the receipt of funds to cover the minimum necessary expenses for the training of specialists. Moreover, these assumptions do not take into account the peculiarities of training in specialties that require specific conditions and an appropriate base. The economically justified minimum number of students for one group will be higher there. A small share of incomplete groups among the wide list of specialties for which training is conducted by popular and powerful HEIs will not lead to losses in the quality of training, since powerful HEIs are able to cover the lack of funding for a specific group to cover the corresponding costs. At the same time, the quality level of specialist training is maintained. The presence of a significant share of incomplete groups to ensure the funding of training costs leads to the need to combine groups from different specialties or specializations, with corresponding adjustments to the curricula, and the loss of not only the uniqueness of the program, but also the quality of training. According to the results of the admission campaign of 2020, according to open data [8], an analysis of the effectiveness of the allocation of state order places under the conditions of the formation of full-fledged, complete groups was carried out. The analysis was carried out in the section of groups of HEIs by size, depending on the contingent (Fig. 7).

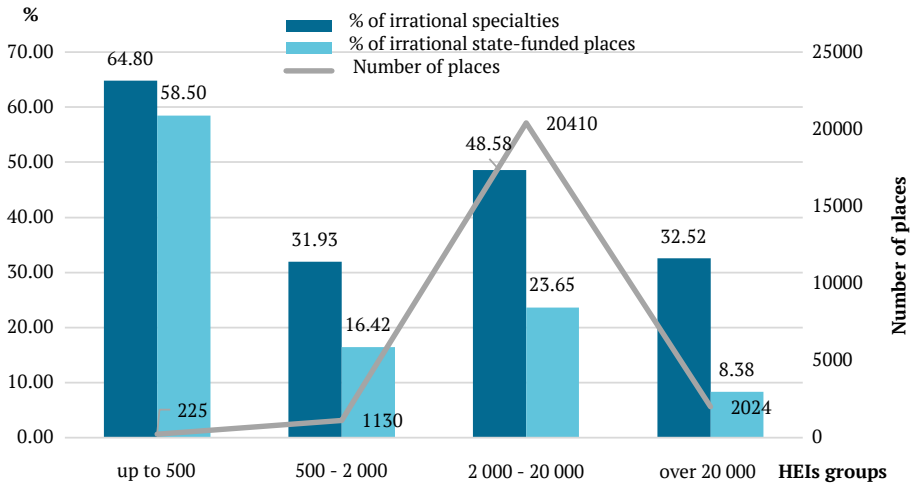


Figure 6. The average level of expenditures of the general fund per higher education seeker by groups of HEIs
Source: created by the author

An analysis of the effectiveness of the distribution of state-funded places was carried out within each group of HEIs. The share of positions, specialties or specializations with incomplete groups in relation to the total number of positions, specialties or specializations for which a certain HEI has been awarded state order places is determined for each HEI. That is, the share of higher education specialties on which the budget was irrationally spent has been determined. The calculation of the share of state-ordered places for such specialties in relation to the total number of budget places provided to the relevant HEI was carried out. The average of the following indicators per group was calculated for each group of HEIs. In the group of small HEIs, with a contingent of up to 500 people, among HEIs that received a state order for specialists training, no full-fledged groups were formed for each of them for an average of 64.8% of positions (specialties or specializations). That is, in 64.8% of specialties, less than 15 students are enrolled with the funds of the state order and the funds of individuals and legal entities. On average, by group, 58.5% of state-ordered places belong to each HEI, which is actually an irrational use of budget funds. In the group of medium-sized HEIs, more than 23% of places on average for each institution are irrationally distributed. 48% of positions from the list for which a state order for the training of specialists was issued are positions with incomplete groups. More than 20 000 state-ordered places, which are irrationally distributed, belong to the group of medium-sized HEIs alone. Out of more than 123 000 places ordered by the state, more than 23 000 places fell to groups with a small contingent and cannot be recognized as rationally used. Almost 20% of the funds of the general fund for specialists training were dispersed in the network of HEIs for training in incomplete groups.

According to the Passport of the budget program 2201160 for the year 2020 [19], the average costs per student (represented contingent) are UAH 55 180.9. Thus, the irrational distribution of state-ordered places leads to inefficient use of budget funds in the amount of over UAH 1.3 billion per year from approved expenditures in the amount of UAH 16.6 billion from general fund. Taking into account the need to train students at the bachelor's level for 4 years (1.3×4=5.2 billion UAH), and the tendency towards an annual increase in the amount of expenses for the training of one student, this amount will increase. The quality of training of students in incomplete groups and the level of compliance of the competences acquired by them with those declared by the program raises certain doubts. This is how an unsuccessful use of budget funds with a distortion of the economic and social effect is achieved. At the same time, conducting a more detailed analysis of each of the

groups of HEIs indicates a significant differentiation between institutions of the same group. In each of the HEIs groups by size, there are segments in which the share of specialties with an irrational distribution of budget places is insignificant, and there is a segment with a significant share of specialties for which there is an insufficient admission of applicants to a certain HEI.

First of all, the HEIs segments with a high share of specialties with irrational distribution of state order places require the most careful attention. The suspension of allocation of state orders for unpopular specialties of such HEIs will lead to their withdrawal from the market of educational services in such specialties. In the conditions of limited financing of the educational sphere, the artificial retention of a significant number of specialties from a wide list of HEIs is unacceptable. There is a list of specialties that are unpopular among applicants, but are in demand in the state and require additional support. For such specialties, it is expedient to concentrate the state order in a few specialized HEIs and ensure the quality of specialist training, rather than scattering 3-5 budget places for all HEIs. Applying an approach with constant monitoring and preventing the allocation of funding for the training of incomplete groups will ensure the selection of only those HEIs that can potentially qualitatively train specialists with higher education in a certain specialty. Ignoring this state of allocation of budget funds harms the state in several directions. In the conditions of the deficit of the State Budget, the constant reduction of expenses for education in general and for funding under the budgetary program of specialists training, the irrational use of budget funds on such a scale is unacceptable. Artificial support at the expense of the funds of the general fund of the budget of a wide list of specialties in all HEIs where they are opened, even in the presence of incomplete groups for a long period, leads to the forced redistribution of funds and the actual underfunding of other specialties at the expense of the funds of the general fund. Systematic training of education seekers in incomplete groups with an insufficient level of funding does not ensure the full acquisition of the necessary list of competencies and affects the quality of training. After a few years, a large number of specialists who do not meet the modern demands of the market enter the socio-economic environment of the country. The problem of retraining and employment arises. There is a postponement of the moment of active inclusion of such graduates in the economy and their creation of economic benefits. At the same time, this leads to image losses of the system of education in Ukraine.

Summarizing the results of the conducted research, the system of higher education of Ukraine needs significant transformations. On the one hand, the extensive network of HEIs with different departmental subordination and different levels of funding does not fully ensure the high quality of training of specialists at each HEI. On the other hand, the present day makes new and new demands on specialists, on their competences, on the education system as a whole. The system of higher education should train specialists of the future, who meet not only modern advanced requests, but also are able to respond quickly to changing requirements. The effectiveness of the use of financial resources can be one of the indicators in the mechanism of optimizing the network of HEIs and improving the quality of education.

High-quality training of specialists cannot be implemented without the introduction of modern information systems and technologies into the educational process. Agreeing with the statement of A. Alqahtani and A. Rajkhan [22] regarding the existence of a close connection between the degree of development and introduction of modern information and distance technologies in the educational process and the results of the educational process, the formation of the so-called success factor, we note the following. The level of readiness of HEIs of Ukraine for e-learning is significantly differentiated. In 2021, not all Ukrainian HEIs are fully ready to conduct training using distance technologies at a high level and in full. The insufficient level of financing of the educational activities of HEIs becomes an obstacle for timely technical re-equipment of the material base, updating of information support and attracting appropriate personnel support. In papers[23] and [24], the directions of transformational processes, including digital transformation, management transformation, their impact on the implementation of educational activities are considered, but exclusively from the perspective of educational institutions. There is no doubt about the need to introduce such transformations within each element of the educational system. The transformational processes of each element of the system create a synergistic effect and lead to the transformation of the system as a whole.

The impact of a combination of factors, namely, technological development, political problems, specific requirements for the higher education system, the inconsistency of society's requests with the existing opportunities of the education system, which are discussed in detail in [25], determine the need for transformations to maintain competitive positions. Sharing the thesis of the authors that innovativeness and creativity at various levels of the educational system affect the competitive position of the educational institution and the growth of the efficiency of the educational system as a whole, at the same time, consideration of the issue of creating a modern innovative, competitive HEI cannot be limited exclusively to managerial aspects and the model of leadership behaviour. The question of financing activities, sufficiency and efficiency of resource use is an integral component of creating a modern innovative HEI. One of the criteria for evaluating the competitiveness of HEIs is the degree of readiness of stakeholders to cooperate with such an institution. Stakeholders, such as the state, individuals and legal entities, provide financing for HEIs, as they act as customers of educational services, scientific developments, etc. The functioning of a competitive model of financing educational activities in the field of higher education will gradually lead to transformational processes of the higher education network, since only the most competitive institutions with the greatest potential will receive a higher level of funding.

A number of studies are devoted to the analysis of the effects that have been achieved as a result of merger processes. A set of approaches to the transformation of the network of HEIs through the application of a set of administrative tools is considered, namely through the decision to merge universities. Q. Liu, D. Patton, M. Kenney [26]

conduct an analysis of the results of the merger of universities in Northern Europe and universities in China. The impact on academic synergy and publication activity of scientists is studied, with the gradation of categories of educational institutions. The authors emphasize the ambiguity of the positive effect of the merger of educational institutions. There is no direct connection between the merger of HEIs and the growth of the rating positions of the newly created institutions, and the growth of the publishing activity of scientific and pedagogical workers of such institutions. The unification of scientific schools did not always lead to scientific results of a new level. The physical unification of various business entities produced the effect of only quantitative growth of certain indicators, as the sum of individual elements. Moreover, cases with an existing negative effect from the merger of the HEIs were studied. Namely, the complication of the processes of managing a new enlarged object, the reduction of its flexibility and the ability to quickly respond to the high rates of change in the modern environment.

An interesting approach to merger, which was introduced in Japan, is given in a study by K. Yoshinaga [27]. In order to strengthen the quality of training in a certain specialty, for example, the medical field, a merger was carried out at the level of structural subdivisions of the same profile but different HEIs. The work summarizes the peculiarities of the financing of such projects, the shortcomings, the problems that arise, and the result of such transformations.

The goal of optimizing the network of HEIs cannot be a formal reduction in the number of institutions due to their merger. The priority should be to ensure the high quality of education. According to the author of the study, the development and implementation of the system of criteria should be integrated into the optimization mechanism of the network of HEIs of Ukraine. Such a mechanism should take into account the peculiarities of the current state of Ukrainian HEIs, modern needs, prospects for the development of the country and the world, and contribute to the implementation of the education development strategy as a whole. The paper [28] proposed generalized "steps to improve the quality of Ukrainian higher education" at the current stage of development. The cost of specialists training is one of the key aspects of financing educational activities. S. Londar [29] was engaged in the study of issues of formation of the cost of training specialists, analysis of differences in the cost of training in one specialty for different HEIs. However, within the scope of his research, he did not carry out a detailed analysis of the presence of incomplete groups in certain specialties and the calculation of their influence on the formation of the cost of training. The author believes that the factor of the presence of incomplete groups in a certain HEI and the share of such groups influence the formation of the average cost of a specialist training in each specialty for HEIs. A significant gap in the cost estimate of the costs for the training of one student under a state order within the same specialty for different HEIs, along with other factors, may be due to the presence of such incomplete groups.

CONCLUSIONS

The work substantiates the direct financial losses of the state from the irrational distribution of the state order among HEIs. The presence of HEIs with a high proportion of incomplete groups indicates a low level of their competitiveness, low opportunities to attract funding from external sources, and certain difficulties in ensuring high quality training of specialists. An analysis of the structure of expenditures of the general fund of the budget of Ukraine for the maintenance of the HEIs network was carried out. An analysis of the financial burden on the budget regarding the maintenance of HEIs of different sizes was carried out, due to the sum of general fund expenditures per student, with the determination of the costliest items. The analysis of the structure of the network of HEIs of Ukraine revealed the need for its optimization in view of the excessive number of small HEIs, the presence of duplicative specialties of training in HEIs, which are subordinate to the Ministry of Education and Science of Ukraine and other ministries and state services, and receive budget funding through various managers of budget funds.

The network of HEIs is significantly differentiated, and different educational institutions have different capacities to attract external sources of funding for students training. According to the results of the research, it was found that there are facts when, for a certain specialty, an educational institution receives a budgetary order for the training of specialists, receives appropriate funding, but is unable to enrol applicants in the number of one academic group, including budgetary and contractual forms of funding. The result of the presence of an incomplete academic group is an insufficient level of funding for the training students of such a group, which affects the quality of their training. The significance of the impact of insufficient funding largely depends on the share of specialties and educational programs for which incomplete groups are formed in the general structure of training for a certain HEI. Among the directions of further research is the development of a model for the distribution of state-ordered places for each specialty among HEIs, taking into account regional needs, ensuring the rational use of budget funds, ensuring high-quality training of specialists; development of a mechanism for optimizing the network of educational institutions with justification of transformation criteria.

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Аналіз мережі закладів вищої освіти та проблеми її фінансування

Анотація. Розглянута проблема якості підготовки фахівців та питання фінансування підготовки здобувачів вищої освіти в Україні за рахунок бюджетних коштів та коштів фізичних і юридичних осіб. Метою дослідження стало виявлення шляхів підвищення ефективності використання бюджетних коштів на фінансування підготовки здобувачів освіти із забезпеченням належної якості підготовки. При проведенні дослідження застосовано інструментарій Data Science для роботи з великими масивами інформації Big Data. У поєднанні із застосуванням сукупності емпіричних методів проведення дослідження дозволило висунути гіпотезу щодо наявності нераціонального розподілу бюджетних коштів між закладами вищої освіти для фінансування підготовки здобувачів за певними спеціальностями. В статті здійснено огляд динаміки розвитку мережі ЗВО (закладів вищої освіти) України за часів незалежності державної, комунальної, приватної форм власності та відомчого підпорядкування. Проведено порівняльний аналіз структури мережі по відношенню до кількості здобувачів у співставленні з відповідною структурою мережі закладів освіти європейських країн та США, що підтвердило актуальність питання оптимізації мережі ЗВО та її структури. Наявність штучно створених ЗВО, які підпорядковані окремим міністерствам та відомствам із привілейованими умовами функціонування поступово знижують якість підготовки за відсутності внутрішньої конкурентної боротьби, що призводить до поступового зниження ефективності використання бюджетного фінансування. В роботі кількісно обґрунтовані фінансові втрати держави від нераціонального розподілу державного замовлення між ЗВО на підготовку фахівців з вищою освітою. ЗВО з високою часткою некомплектних груп, які не спроможні забезпечити високу якість підготовки фахівців, не спроможні залучати зовнішні джерела фінансування підготовки фахівців у наслідок неконкурентоспроможності на ринку освітніх послуг, лише витрачають бюджетні кошти без належного результату. За результатами досліджень запропоновано узагальнені критерії оптимізації мережі ЗВО України, які можуть бути використані державними органами України

Ключові слова: державне замовлення на підготовку фахівців, критерії оптимізації, формування спеціального фонду, формування загального фонду, використання коштів на освіту, витрати на підготовку здобувачів