

DIVERSIFICATION OF SOURCES OF FINANCING HIGHER EDUCATION: THE EXPERIENCE OF REFORM IN EUROPEAN COUNTRIES

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Abstract: The exacerbation of the shortage of financial resources in the current global challenges has necessitated increased efficiency in the financing of higher education institutions. Along with the increase in funding, diversification of sources and transformation of funding mechanisms for higher education systems have become topical issues. The study attempted to identify the internal structure of public funding for higher education in Europe concerning funding mechanisms. According to the results of clustering of European countries based on coverage of the population with higher education and public spending on higher education by one undergraduate, eight clusters were identified, four of which are unique and contain one country (Greece, Cyprus, Turkey, Luxembourg). Four other clusters cover countries with: incomplete public funding for higher education; state protectionism in the financing of higher education; specific forms of state funding for higher education; strategic state priority in financing higher education. The general patterns of financing higher education in European countries, the experience of expanding funding sources, efficient use of financial resources and granting autonomy to universities, which can be taken into account in the process of higher education reforms in countries with transformational economies.

Keywords: Europe, Funding, Funding mechanism, Funding sources, Higher education.

1 Introduction

The modern system of higher education is in the process of constant transformation. Funding for higher education in different countries is a priority area of the state and regional authorities. At the same time, the national features of higher education financing formed over many years in most countries under the influence of globalisation processes and financial and economic crises are undergoing significant reforms. These changes are mainly influenced by globalisation processes. The impetus for active reforms of the higher education system was the global financial crisis of 2008, after which there was a tendency to find ways to increase cost-effectiveness against the background of reduced budget expenditures on higher education. With the exacerbation of global challenges and constant changes in the financial situation in the world, the general approach to financing higher education institutions in developed economies is to increase spending efficiency and at the same time increase the level of independence (both in spending and managing own resources), as well as stimulating higher education institutions in the direction of developing their strategies for further development, making efforts to expand/diversify funding sources.

There are more than two hundred national higher education systems in the world, which indicates a significant variety of approaches to their funding. During the so-called Great Recession caused by the coronavirus pandemic, there has been stagnation or even a relative reduction in the share of public funding for higher education concerning total budget expenditures or national gross domestic product (GDP). This encourages governments and higher education institutions themselves to develop actively other channels of funding, alternative sources of funding. Therefore, the analysis of the development of the main forms of financing higher education in modern conditions in European countries is relevant, which is the direction of this article.

2 Literature Review

Scientific and practical principles of financing higher education in different countries are the subject of a significant amount of research. In particular, several publications are devoted to

improving the mechanisms of financing higher education in conjunction with modern globalisation processes [3], [4], [17], [20], [21]. The experience of organising and financing higher education in some countries of the world is characterised in detail, for example, Australia [6], China [3, 5], Russia [30], the USA [19, 31, 36], etc. Attention is also paid to the peculiarities of the development of higher education and the patterns of its funding in different regions of the world. In particular, the mechanism of financing higher education in European countries is often the only object of study [7, 10].

Despite the close systems of value priorities, socio-cultural features, mostly a single economic space, national funding mechanisms for higher education in European countries are quite diverse. All the variety of mechanisms for budget funding of European higher education institutions is implemented as follows [1, 2, 10]:

- The amount of funding depends on the set of indicators achieved by the higher education institution (number of students, number of graduates, volume and results of research work, etc.) (most European countries);
- According to the funding formula, the budget of the higher education institution is agreed with the funding body (Great Britain, Germany, Spain, Malta, Estonia);
- The amount of funding is determined by the funding body as a result of cost estimates by higher education institutions for previous periods (Denmark, Iceland, Norway, Portugal);
- The amount of funding is determined on a contractual basis between the funding body and the higher education institution to achieve reasonable strategic goals (Austria, Belgium, Bulgaria, Greece, Denmark, Iceland, Romania, Slovakia, Finland, France, Czech Republic);
- The amount of funding is determined on a contractual basis between the funding body and the higher education institution, taking into account the need for specialists in relevant specialities (Bulgaria, Estonia, Latvia, Lithuania).

In general, with certain modifications to determine the amount of budget funding for higher education institutions in European countries [9], [10], [11], [18], [27] a budget is formed, which is agreed with the funding body using mechanisms: application, executive contract, justification of strategic goals or other conditions and relevant documents. Following the listed mechanisms, the volumes of budgetary financing of educational activity by the institution of higher education are formed. Research activities of higher education institutions are also funded by budget funding. In most European countries, special funds are created for this purpose, which allocates funds on a competitive basis.

Indirect financial support in the form of tax benefits (deductions, discounts, etc.) also plays an important role in supporting consumers of higher education services [13]. Socially responsible business is involved in the implementation of state and regional programs for the development of higher education at the regional level [23].

At the level of the Council of the EU, the European Commission and Pan-European events, recommendations are increasingly being made on the advisability of expanding funding for higher education based on the results achieved [12]. Increasingly, it is a question of ensuring the financial stability of universities, increasing the efficiency of their funding. Governments encourage activities aimed at generating income from universities through cooperation with business, concluding contracts for the provision of various services. In many countries, such additional income becomes significant in the revenue structure (about 10% of total university budget revenues).

The general patterns of higher education funding in different countries, the experience of expanding funding sources, their effective use and granting autonomy to universities show a wide diversification of funding sources and expanding financial autonomy of higher education institutions, which is an important factor in improving financial resources.

3 Materials and Methods

General and specific scientific methods based on a systematic approach were used in the research process. In particular, the method of generalisation was used to determine the general patterns of financing higher education in European countries. Initial data for statistical confirmation of the identified patterns of financing of higher education in Europe were obtained from official sources [26, 28, 32]. Cluster analysis was used to group European countries according to the peculiarities of higher education funding. Among the wide set of methods of cluster analysis, the method of finding trout concentrations was chosen as one that allows determining the "natural structure" of a group of objects with a small error in their large set [29, p. 5].

At the beginning of the method implementation of the rationing of the initial data was carried out. The initial data are formed by groups of indicators: the share of the population covered by higher education, % of the total population; the amount of public expenditure on the training of one undergraduate for higher education, UAH. Next, the Euclidean distances between objects are calculated and the corresponding matrix is formed. Then in several iterations, there is a search for condensations in hyperspheres based on the matrix of Euclidean distances. The sum of interclass distances between objects is used as a criterion for the quality of clustering.

4 Results

The coverage of the country's population with higher education may well depend not so much on the level of development of higher education, socio-cultural traditions and sources of its funding, but on the age structure of the population. Thus, in Europe, the share of the population covered by higher education in 2018 ranges from 0.93% (Malta) to 6.87% (Greece), with an average value of 3.72% of the total population (Table 1). The share of the population covered by higher education is mostly around 3% and national governments are making every effort to ensure that this share does not decrease. Existing exceptions are most often due to the age structure of the population (Malta, 0.93%) and its active involvement in educational tourism.

In general, there are several countries for which educational tourism is common and directly subsidised by the national government. Thus, higher education, given its impact on future economic growth and the importance of private sources of funding, is becoming one of the most profitable areas of the economy. At the same time, it should be borne in mind that the diversification of organisational forms of higher education, the spread of short educational programmes and lifelong learning programmes significantly affect the growth of the population involved in the higher education system.

Table 1: General quantitative characteristics of the development of higher education in Europe and its public funding

According to the countries	The amount of public spending on higher education		Coverage of the population with higher education		
	In general, million euros	% to GDP	Population, thousand people	Share of population covered by higher education, %	Number of students per research and teaching staff in European countries
Austria	5702,54	1,71	8822,27	3,79	13,8
Belgium	5869,08	1,45	11398,59	4,17	15,3
Bulgaria	374,04	0,81	7050,03	3,26	11,5
Greece	1198,05	0,62	10741,17	6,87	38,7
Denmark	6862,42	2,45	5781,19	4,60	15,6
Estonia	226,62	1,14	1319,13	3,28	12,8

Spain	10809,04	0,93	46658,45	3,33	12,3
Italy	12266,15	0,75	60483,97	3,07	20,3
Cyprus	241,81	1,16	864,24	4,74	22,0
Latvia	1114,09	0,69	1934,38	3,33	16,3
Lithuania	282,08	0,75	2808,90	4,12	14,4
Luxembourg	190,88	0,46	602,01	0,93	4,4
Malta	128,97	1,25	475,70	2,75	9,4
The Netherlands	11323,28	1,59	17181,08	4,94	14,6
Germany	36935,74	1,25	82792,35	3,54	12,0
Norway	7759,06	2,11	5295,62	5,13	9,4
The UK	31149,64	1,44	66273,58	3,13	15,4
Poland	5094,04	1,08	37976,69	3,82	13,8
Portugal	1497,55	0,80	10291,03	3,14	14,3
Romania	1223,58	0,72	19533,48	2,66	19,8
Serbia	422,33	1,16	7001,44	3,49	24,2
Slovakia	404,64	0,79	5443,12	2,48	11,4
Slovenia	397,03	0,95	2066,88	3,06	14,4
Turkey	42259,94	1,59	80810,53	5,81	25,1
Hungary	991,92	0,80	9778,37	2,69	11,5
Finland	3362,37	1,66	5513,13	5,00	15,3
France	27115,26	1,23	67026,22	3,05	16,2
Czech Rep.	635,01	0,70	10610,06	2,88	15,0
Sweden	7927,23	1,79	10120,24	3,81	10,1

The effectiveness of higher education systems depends on the effectiveness of the use of scientific and scientific-pedagogical staff, the intensity of their involvement in the educational process. As a rule, the number of students per teacher is correlated with the coverage of the population with higher education. Thus, in Cyprus, 4.74% of the population is covered by higher education and there are 22 higher education students per teacher, in Turkey – 5.81% and 25 students, respectively. However, the mathematically significant dependence "the number of people covered by higher education → the number of students per teacher" is not different. On average in Europe, there were 15.3 students per teacher. The workload per teacher is much lower in Luxembourg, slightly lower in Malta, Norway and Sweden.

Public funding of higher education in the vast majority of developed countries dominates over private [24]. For example, in the Netherlands, Germany, Finland, and Sweden, the state pays 100% of the cost of higher education, in New Zealand 96%, in Canada 89%, in the United Kingdom 88%, and so on. Among the sources of funding for higher education in European countries is dominated by public funding, the volume of which is constantly growing. In Europe, public funding for higher education per undergraduate in 2018 ranges from 1,624.25 euros/year (Greece) to 3,486.17 euros/year (Luxembourg).

The average state expenditure on training one higher education undergraduate in Europe in 2018 is 10,920 euros. However, both the indicators of higher education development in Europe and the amount of its funding are distributed quite unevenly. There are also some regularities regarding the distribution of public funding for higher education (in % of GDP) by European countries and the amount of such funding. Rather, the amount of funding depends on the volume of GDP production, the degree of wealth of the country. Thus, in Luxembourg 0.46% of GDP is spent on higher education, with a small population, higher education covers 0.93% of the population, the cost of providing education to one higher education student is the highest in Europe – 34086.16 euros/year.

The study attempted to identify the internal structure of public funding for higher education in Europe and its distribution. The clustering of European countries by the share of the population covered by higher education (% of the total population) and the amount of public expenditure on the training of one higher education student revealed a high level of heterogeneity in their dispersion (Table 2).

Table 2: Results of the cluster analysis of European countries on the coverage of the population with higher education and the amount of public funding of one undergraduate *

Cluster number	The composition of the cluster	Cluster centre	
		Share of the population covered by higher education, % of the total population	The volume of public expenditures for the training of one higher

			education undergraduat e, euro/year
1	Greece	6,872	1624,25
2	Bulgaria, Estonia, Italy, Spain, Latvia, Lithuania, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Hungary, Czech Republic	3,175	3863,29
3	Austria, Belgium, Latvia, Sweden, Malta, Germany, the United Kingdom, France	3,395	13915,15
4	Cyprus	4,742	58907,71
5	Ireland, Iceland, the Netherlands, Finland	4,732	12563,44
6	Norway, Denmark, Switzerland	4,865	27192,26
7	Turkey	5,816	8998,17
8	Luxembourg	0,932	34086,16

The four European countries form four separate clusters: Greece, Cyprus, Turkey and Luxembourg. Of these, three (Greece, Cyprus, Turkey) have a higher secondary education enrolment than the average, and the cost of training one undergraduate with higher education is much lower than the average. Luxembourg forms the cluster in which the share of the population receiving higher education is the least significant (0.932% of the total population), but the cost of training one undergraduate at the expense of the budget is the highest. These four clusters are the exception rather than the rule in public funding of higher education.

The following patterns of state funding of higher education can be identified for the other clusters:

- Cluster 2 (Bulgaria, Estonia, Italy, Spain, Latvia, Lithuania, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Hungary, Czech Republic) – countries with higher education, lower than secondary and low public funding. The main share of this cluster is formed by the countries of the post-Soviet space, small population and catching up with economic development (the conditional name of the cluster is "incomplete state funding of higher education");
- Cluster 3 (Austria, Belgium, Latvia, Sweden, Malta, Germany, the United Kingdom, France) – developed countries where traditional higher education formats are largely state-funded. At the same time, the models of financing higher education are specific, and the share of the population covered by higher education is higher than the average (conditional name of the cluster "specific forms of state financing of higher education");
- Cluster 5 (Ireland, Iceland, the Netherlands, Finland) – high level of higher education coverage and significant public funding for the education of one undergraduate (conditional name of the cluster "state protectionism in higher education funding");
- Cluster 6 (Norway, Denmark, Switzerland) – high level of higher education coverage and a very high level of funding for training of one higher education undergraduate (conditional name of the cluster "strategic state priority in higher education funding").

Private funding for higher education in European countries is also important (Table 3).

Table 3: Private financing of higher education expenditures in European countries, 2018 *

According to the countries	The amount of private expenditure on the training of one undergraduate for higher education, Euro	The ratio of private costs for the preparation of one undergraduate to the state, %
Austria	15951,29	93,57
Belgium	11066,10	89,66
Greece	1833,83	112,90
Denmark	14753,13	57,14
Estonia	5050,18	96,49
Ireland	8303,13	61,86
Iceland	8190,67	72,46

Spain	5991,43	86,02
Italy	5292,27	80,00
Latvia	17523,07	101,45
Lithuania	2277,49	93,33
Luxembourg	29640,15	86,96
The Netherlands	9229,16	69,18
Germany	10094,49	80,00
Norway	24370,77	85,31
The UK	5221,01	34,72
Poland	2924,99	83,33
Portugal	4051,81	87,50
Slovakia	2279,81	75,95
Slovenia	5942,04	94,74
Turkey	6791,08	75,47
Hungary	3295,10	87,50
Finland	10278,12	84,34
France	11842,85	89,43
Czech Republic	2671,61	128,57
Switzerland	22956,70	88,24
Sweden	14922,77	72,63

In the vast majority of European countries, private funding is as important as public funding or is close to public funding. On average, private financing of higher education expenditures by one undergraduate in 2018 in European countries is 84.03% of public expenditures, maximum – 128.57% of public expenditures (Switzerland), minimum – 34.72% of public expenditures (the United Kingdom).

5 Discussion

The amount of funding for higher education and the quantitative performance of higher education institutions directly depends on the organisation of the funding mechanism. In the work [22, p. 58] four basic European models of budgetary financing of higher education are distinguished:

- *Model A.* The main source of financial resources in this model is budget funds, which are transferred directly from the state to higher education institutions. The institution of higher education undertakes to train the necessary specialists at the established prices for educational services. This model minimises the state's expenditures on higher education, ensures its efficiency in terms of meeting social needs and reduces the costs of higher education. A similar model of financing higher education is used by England, Germany, France (cluster 3);
- *Model B.* The main source of funding for higher education is also budget funds, but higher education institutions receive funds on a competitive basis, and it is the higher education institutions that compete with each other, not its undergraduates. Competitive indicators do not concern the results of higher education institutions, but the purchase of educational services. This model is used by Sweden (cluster 3);
- *Model C.* The amount of funding for higher education is based on objective quantitative indicators of institutions: the number of students, the number of graduates, the number of defended dissertations, the number of publications, the quality of courses, etc. These indicators relate to the performance of higher education institutions. This model is used in the Netherlands (5th cluster) and Romania (2nd cluster);
- *Model D.* Budget funds for financing higher education are distributed through a system of certificates, which are distributed directly among entrants. The applicant submits his / her certificate to the higher education institution, if the tuition fee is higher than the value of the certificate, the applicant pays the additional tuition fee (Finland, 5th cluster). Mostly the costs of higher education are borne by the undergraduates.

Graphically, the relationship between models of financing higher education from the budget in European countries is reproduced in Figure 1.

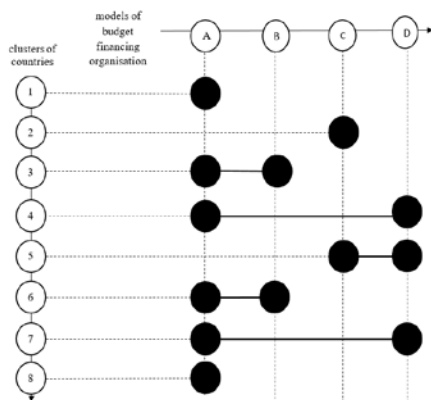


Figure 1 – Relationship between models of budget financing of higher education in European countries and their cluster distribution *

Of course, the presented scheme reproduces the most common cases of the connection between the mechanism of budget financing of higher education in the country and its belonging to a particular cluster.

Each country has its characteristics in the implementation of the funding model. For example, Switzerland (cluster 6) uses the B funding model, but the source of funds is not only public financial resources, but also funds from local cantonal budgets, corporate funds, charitable funds, and so on. Moreover, Switzerland is currently reforming its system of financing higher education, gradually shifting it towards model A.

In Greece, model A is implemented with the diversification of funding sources, but budget funds for higher education are spent mainly through targeted programs (ISKED, ERASMUS, Leonardo da Vinci, Grundtvig) [5, p. 86-88], and programmes for higher education, lifelong learning, acquiring new competencies based on secondary education, etc. are widely presented. The funding mechanism provides a combination of funding for education from the budget for those students who have best passed the central exam [15, p. 37] and private funding, for those students who have passed the Öğrenci Seçme Sınavı – student selection exam. In Cyprus (cluster 4) there is also a combination of models A and D, but they are implemented differently. The vast majority of indigenous Cypriots receive funding for higher education costs from the state, while foreign students (and their number is quite significant) pay the cost of education themselves. Model A is being implemented in Luxembourg, and public funding accounts for more than 90% of all education expenditures [34, p. 64].

Diversification of funding sources for higher education institutions is a global trend in meeting their financial needs. In most countries of the world, higher education institutions have financial autonomy, which helps to attract additional financial resources to meet the needs of research, improve the quality of educational services.

The quality of higher education and its accessibility for the population of the country depends on the amount and mechanism of funding. According to the European Commission on Higher Education, the main source of financial resources for higher education institutions is public funds [14]. However, the availability of sufficient funds for higher education to finance higher education is one of the most important factors in its decision – to enter a higher education institution or not. According to the comparative report of the European network Eurydice "Tuition fees and support systems for students in higher education in Europe 2020/2021" the problem of creating a perfect mechanism for financing higher education exists in 38 countries and 43 higher education systems [8].

6 Conclusion

Current trends in the development of higher education involve diversifying the forms of its organisation and funding with the introduction of increasingly specialised educational programmes. Higher education has become an important factor in the development of national economies and an important factor ensuring their competitiveness. At the same time, the growing shortage of financial resources in the context of today's global challenges has led to the need to ensure the effectiveness of the functioning and financing of higher education systems, which has determined the transformation of their financial security. In the context of globalisation, the higher education systems of different countries are developing rapidly, governments of developed countries are actively supporting indirectly national education systems and individual universities in foreign markets, adopting special programmes to promote academic mobility, funding marketing activities and weakening or strengthening immigration policy.

The generalisation of the experience of European countries in the implementation of various financing mechanisms to improve the efficiency of budget use shows the use of various mechanisms of public funding of higher education allocated to higher education institutions and their active encouragement to attract financial resources for effective functioning and development. In general, the focus of funding mechanisms on the diversification of funding sources, the dependence of funding on the performance of higher education institutions and the ratio of educational programmes and labour market demands. Public and private spending on higher education in Europe is equivalent, but how it is used are national. The gradual increase in funding from various sources in all European countries does not lead to the unification of funding mechanisms and reduce their diversity.

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