CURRENT TRENDS IN HIGHER EDUCATION IN THE REPUBLIC OF MOLDOVA: FACTORS OF STUDENT ENROLLMENT AND RETENTION

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Abstract: *The article provides an assessment of higher education in the Republic of Moldova for the period 2017-2023 based on data from the National Bureau of Statistics of the Republic of Moldova. It examines the dynamics of higher education institutions, the number of students in educational programs, and gender disparities in the choice of study fields. The aim of this research is to identify factors influencing the dynamics of the number of students in higher education institutions relative to the overall population of the country. The research employed methods of economic analysis and correlation regression. The results of the correlation analysis indicate that the dynamics of the number of students relative to the overall population of the country depend on factors reflecting various aspects of the educational environment by 97.25%, emphasizing the importance of creating favourable conditions for education and ensuring accessibility of higher education in the country.*

Keywords: *enrollment of young people in higher education, gender stereotypes, accessibility of higher education institutions.*

Jel Classification: J10, I25.

1. Introduction

In the modern world, the availability and quality of education determine the level of economic development of any country. Countries with a high percentage of educated population have prerequisites for saving budget funds for social protection, health care and other expenses.

However, the percentage of young people enrolled in higher education varies across countries. It depends on a set of factors: the economic development of the country, cultural characteristics, access to and quality of higher education and other factors.

Obviously, there are barriers to higher education in low-income countries. In addition to having to pay for a tuition contract, families must provide financial support for the maintenance of a student who temporarily does not bring income into the family budget.
Cultural characteristics can influence the formation of gender stereotypes (Savinskaya, Lebedeva, Vilkova, 2022; Khasbulatova, Smirnova, 2020). There is a disparity across countries in terms of young women's access to higher education, including engineering and technical education. At the same time, the influence of stereotypes on young people's decision to receive education has not yet been sufficiently studied (Maloshonok et al., 2022).

The accessibility of higher education institutions is an important argument for young men and women in the formation of professional self-determination: location of educational institutions, access to information technologies, financial support from the state, scholarships, social integration (Shmeleva, Froumin, 2020), etc. All these aspects are important for the youth's enrolment rate in higher education and the nature of their manifestation ultimately determines the number of young people in higher education, and the nature of their manifestation ultimately determines the number of students enrolled in higher education institutions each year.

An important condition for making a decision in favor of higher education is also the presence of a high level of schooling of potential applicants (Panina, 2018).

Thus, the above factors, interacting with each other, determine the level of youth involvement in higher education in each country.

The purpose of this research is to evaluate the higher education of the Republic of Moldova and to identify the influencing factors on the dynamics of the number of students of higher education institutions of the country in relation to the total number of inhabitants of the country. The baseline information was the data of the National Statistics Bureau of the Republic of Moldova for the period 2017-2023 (7 years).

2. Research methods

The baseline information for the study was the official data of the National Bureau of Statistics of the Republic of Moldova, characterizing the higher education of the Republic of Moldova for the last 7 years (period 2017-2023).

General methods of statistical data processing and correlation regression were applied as research methods.

Correlation analysis allowed us to comprehensively study and quantify the impact of various factors on the economic phenomenon under consideration in the absence of a functional relationship between the resultant indicator and the arguments.

Application of this method provided an opportunity to consider the factors of interest to the authors and their impact on the resultant indicator by including in the mathematical model the variables for which there is no rigidly deterministic relationship with the economic phenomenon.

3. Results and discussion

3.1. Characteristics of higher education in the Republic of Moldova

The dynamics of key performance indicators of higher education institutions is presented in Table 1.

Table no. 1. Dynamics of main indicators of higher education institutions´ activities

Indicators	2017	2018	2019	2020	2021	2022	2023
Number of institutions, including:	30	29	29	27	24	24	21
- public institutions	19	19	19	18	16	16	13
Total number of students, including:	74 726	65 543	60 608	56 840	59 033	59 647	56 758
- public institutions	62 108	55 341	50 620	47 745	49 549	50 197	47 942

Source: National Bureau of Statistics of the Republic of Moldova, 2023. *Statistical Yearbook of the Republic of Moldova 2022*. [pdf] Available at: <https://statistica.gov.md/files/files/publicatii_electronice/Anuar_Statistic/2022/Anuarul_statistic_editia_2022.pdf> [Accessed 26 October 2023].

Based on the data presented in Table 1, it can be concluded that the number of higher education institutions decreased from 30 to 21 units or by 30% during the period under review. The share of public institutions in the total number of higher education institutions remained unchanged (approximately 60%) for the period 2017-2023.

Against the background of the decline in higher education institutions, there was a decline in enrollment, but at a lower rate (by 24.1% in 2023 compared to 2017).

Despite the absolute decrease in the number of students in higher education, the enrollment of young people in higher education is increasing annually, which is assessed positively (Figure 1).
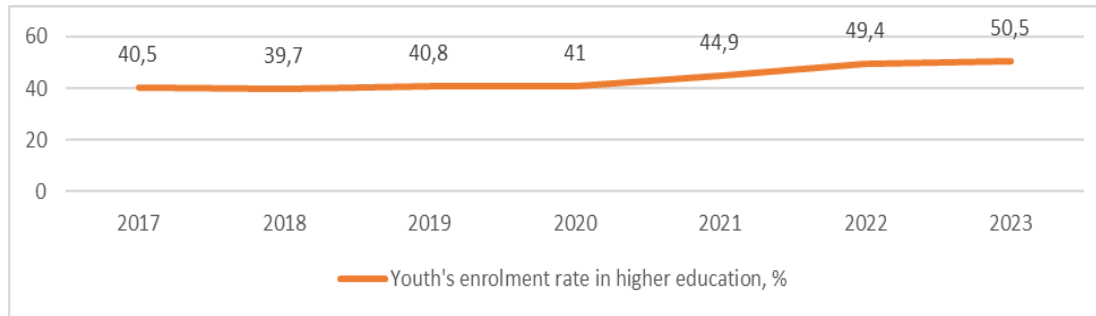

Figure no. 1. Evolution of youth enrollment in higher education
Source: *Republic of Moldova 2023*. [pdf] Available at: <https://statistica.gov.md/files/files/publicatii_electronice/Educatia/Educatia_editia_2023.pdf > [Accessed 23 October 2023].

The structure of higher education students by educational programs (1 - Licence's; 2 - Master's; 3 - Integrated higher education) is presented in Figure 2.
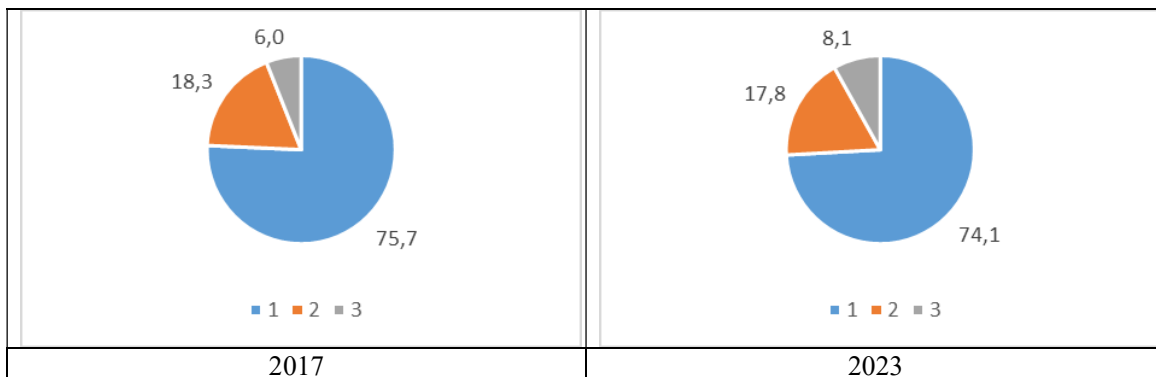

Figure no. 2. The structure of higher education students by educational programs
Source: *Republic of Moldova 2023*. [pdf] Available at: <https://statistica.gov.md/files/files/publicatii_electronice/Educatia/Educatia_editia_2023.pdf > [Accessed 23 October 2023].

The largest share of students of higher education institutions falls on the 1st cycle of study, which practically remained unchanged and amounted to approximately 75% for the period under review. There are tendencies to increase the share of students studying in the 3rd cycle of education (from 6.0% in 2017 to 8.1% in 2023).

Distribution of students by sex and some general field of study in 2023 is presented in Figure 3.

Based on the data presented in Figure 3, it is possible to notice a significant gender disproportion in the contingent of students in some areas of training according to the data of

2023. In particular, the share of female students prevails in educatioan, languaged, social and behavioral sciences (approximately 80-85%), is identical to the share of male students in veterinary veterinary and humanities (approximately 50%), is inferior to the share of male students in forestry, security services, engineering and engineering activities (no more than 20%). As noted earlier, this situation is influenced by gender stereotypes based on the notion that girls are born with less ability to study exact sciences compared to boys (Shmeleva, Froumin, 2020).
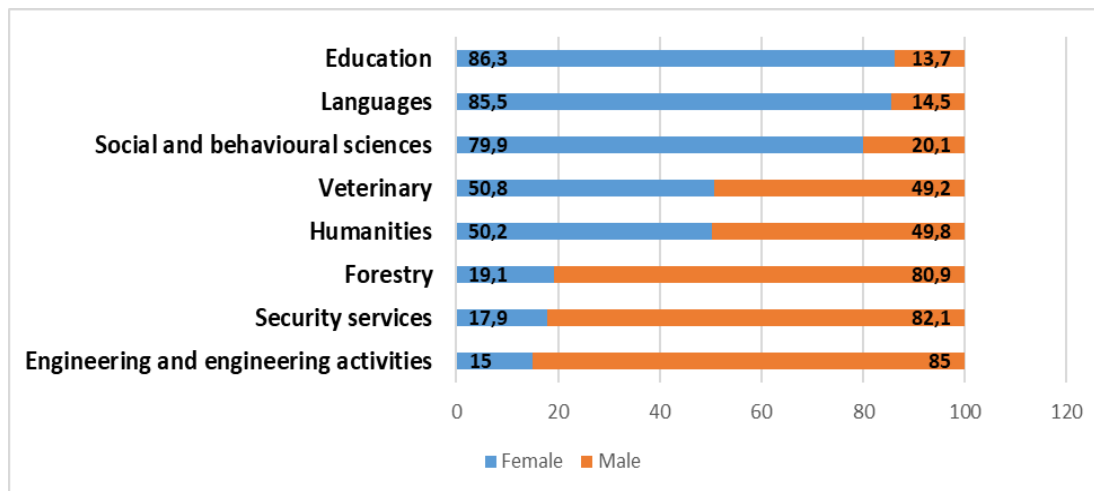

Figure no. 3. Distribution of students by sex and some general field of study in 2023
Source: National Bureau of Statistics of the Republic of Moldova, 2023. *Students in higher education insttitutions,* 2023. [online] Available at: <https://statbank.statistica.md:443/PxWebPxWeb/pxweb/ro/30 Statistica sociala/30 Statistica sociala__07 INV__INV060/INV060060.px/> [Accessed 25 October 2023].

    Student retention and graduation is an important issue in higher education.
    Student retention measures can include activities aimed at increasing access to education through scholarships and financial support, as well as the provision and improvement of accommodation for students, including youth from less affluent areas.
    The dynamics of indicators characterizing different aspects of student support is presented in Table 2.

Table no. 2. Dynamics of indicators characterizing different aspects of student support

Indicators	2017	2018	2019	2020	2021	2022	2023
Share of students in public higher education institutions on a budget basis, %	41.7	42	43.2	43.5	43.9	43.3	43.7
Share of students of higher education institutions provided with	76.2	69.9	88.1	95.4	86.9	85.7	85.8

hostels, %							

Source: National Bureau of Statistics of the Republic of Moldova, 2023. *Education in the Republic of Moldova 2023*. [pdf] Available at: <https://statistica.gov.md/files/files/publicatii_electronice/Educatia/Educatia_editia_2023.pdf> [Accessed 23 October 2023].

Based on the data presented in Table 2, it can be concluded that the situation in the field of student support has improved over the period 2017-2023, as there was an overall increase in the proportion of students studying on budget places and the proportion of students who were provided with a place to live in a dormitory.

At the same time, this situation did not have a positive impact on the dynamics of the ratio of students who graduated from higher education institutions to the total number of students (Table 3).

Table no. 3. Evolution of the share of graduates of higher education institutions in the total number of students

Indicators	2017	2018	2019	2020	2021	2022	2023
Number of graduates, including:	21 886	19 943	18 142	16 266	14 650	14 084	13 847
- public institutions	17 632	16 228	14 945	13 267	12 108	11 653	11 565
Share of graduates of higher education institutions in total number of students of higher education institutions, %	28.4	29.3	29.5	27.8	24.4	23.2	24.1

Source: National Bureau of Statistics of the Republic of Moldova, 2023. *Education in the Republic of Moldova 2023*. [pdf] Available at: <https://statistica.gov.md/files/files/publicatii_electronice/Educatia/Educatia_editia_2023.pdf> [Accessed 23 October 2023].

An alarming point is the decrease in the share of graduates of higher education public institutions in the total number of students of public institutions (from 28.4% to 24.1% or by 4.3 percentage points). Obviously, there are certain reserves to improve the situation by implementing a number of strategies and activities aimed at creating a more favorable learning environment both at the state level and at the level of higher education institutions.

3.2. Multi-factor mathematical stochastic model to establish the relationship between the size of students studying in higher education institutions of the Republic of Moldova and the existence of favorable conditions for their attraction and retention in the higher education system

The input data for calculating the multi-factor mathematical correlation model are presented in Table 4.

Based on the obtained results of correlation analysis, we can conclude that there is a linear-correlation relationship between the ratio of higher education students per 1000 inhabitants and the following indicators considered as influencing factors:

x1 - youth enrolment rate in higher education, %;

x2 - share of students in public higher education institutions on a budget basis, %;

x3 - share of students of higher education institutions provided with hostels, %;

t - time, years. The number of observations was 7 (2017-2023).

The multiple correlation equation is as follows:

$$Y = -5.9592 + 0.7513 * x1 + 0.0946 * x2 + 0.0030 * x3 - 1.9875 * t$$

Table no. 4. Input data for correlation analysis

Years	Ratio of higher education students per 1000 inhabitants, points (Y)	Youth enrolment rate in higher education, % (x1)	Share of students in public higher education institutions on a budget basis, % (x2)	Share of students of higher education institutions provided with hostels, % (x3)	Time, years (t)
2017	26.9	40.5	41.7	76.2	1
2018	24.0	39.7	42.0	69.9	2
2019	22.6	40.8	43.2	88.1	3
2020	21.5	41.0	43.5	95.4	4
2021	22.5	44.9	43.9	86.9	5
2022	23.3	49.4	43.3	85.7	6
2023	22.6	50.5	43.7	85.8	7

Source: Educatia editia 2023, 2023.

The test of regression coefficients by Student's test showed that their value is significant, since the calculated reliability of the correlation coefficient is higher than the tabulated value (Table 5).

Table no. 5. Regression coefficients according to Student's test

Parameter	Coefficient	Critical value of Student's T-test	Calculated Student's T-test
Intercept	-5.9592	42.6506	-0.1397
b 1	0.7513	0.1898	3.9581
b 2	0.0946	0.9568	0.0989
b 3	0.0030	0.0485	0.0616
t	-1.9875	0.5976	-3.3259

Source: compiled by the authors.

The economic meaning of the obtained regression coefficients means:

a) b1 - an increase of youth enrolment rate in higher education by 1% will lead to an increase in the ratio of higher education students per 1000 inhabitants by 0.7513 points, which when rounded off will amount to 1 student per 1000 inhabitants;

b) b2 - a 1% increase in the share of students on a budget basis will result in an increase in the ratio of higher education students per 1000 inhabitants by 0.0946 points;

c) b3 - a 1% increase in the share of students provided with hostels will increase the ratio of higher education students per 1000 inhabitants by 0.0030 points;

d) t - the ratio of higher education students per 1000 inhabitants is reduced annually by 1.9875 points, which, when rounded off, will amount to 2 students per 1000 inhabitants (for this set of factors).

The obtained value of the coefficient of determination (0.9725) indicates the integrity of the relationship equation. The change in the ratio of higher education students per 1000 inhabitants by 97.25% is influenced by the factors included in the mathematical model. The correlation coefficient is 0.9862. Evaluation of the results by Fisher's criterion showed that the value of the multiple correlation coefficient is considered significant because F calculated = 17.701 (number of degrees of freedom f1=7, f2 = 7-4-1=2 and significance level q=0.1) is greater than F tabulated = 9.35 (Raspredelenie Fishera (F-raspredelenie), 2019).

5. Concluding remarks

The level of economic development of any country depends on the quality and availability of education. In countries with a highly educated population, conditions for accelerated development in various spheres of the economy arise.

Against the background of the reduction of higher education institutions and decrease in the number of students, there is an annual increase of youth enrolment rate in higher education. The largest share of students of higher education institutions falls on the 1st cycle of education (more than 74.1% in 2023).

The distribution of students by general field of study is characterized by a disproportion in terms of gender, largely due to gender stereotypes.

In order to retain students in the education system and increase the share of graduates of higher education institutions, it is necessary to take measures aimed at expanding the accessibility of education through the provision of scholarships; career guidance work aimed at stimulating interest in higher education; reducing financial barriers through the application of a flexible system of tuition fees; increasing the attractiveness of the educational process by improving living conditions for students, etc. The above-mentioned measures are designed to provide favorable conditions for education.

According to the results of correlation analysis, it was found that there is a linear-correlation between the ratio of higher education students per 1000 inhabitants and the following factors: the youth enrolment rate in higher education, the share of students in public higher education institutions on a budget basis, the share of students of higher education institutions provided with hostels. The results of the analysis can contribute to changing the situation in the field of higher education by influencing the above factors of influence and are of interest to all participants of the education system.

In subsequent studies in this area it seems interesting to identify and assess the degree of influence of factors on the dynamics of the share of graduates of higher education institutions in the total number of students.

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