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EDICIONES COMPLUTENSE

Assessment of the share of women in the scientific and pedagogical staff: data from modern countries

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Abstract: Introduction. Currently, higher education is important in the training of highly qualified specialists, the creation of new knowledge, and the introduction of innovations. **Objectives.** The purpose of our study was to evaluate the indicators characterizing the gender structure of scientific and pedagogical personnel in higher educational institutions of various countries. These indicators were the share of female teachers in the total number of teachers of higher educational institutions. **Methodology.** We used data from the UNESCO Institute for Statistics for 107 countries. We used the density functions of the normal distribution as models. **Results.** The results of the computational experiment showed that the share of female teaching staff in the number of scientific and pedagogical staff on average in the countries under consideration was 41.6%. Women make up more than half of the teaching staff in twenty-four countries. The predominance of men as teachers of higher education institutions was in seventy-eight countries. The countries with the maximum and minimum values of such indicators as the share of female teachers in the scientific and pedagogical staff were identified. A significant difference was proved for groups of countries with maximum and minimum values of indicators. **Contribution.** The proposed methodological approach and the results obtained have a scientific novelty, since the assessment of the territorial features of the gender structure of teachers of higher educational institutions has not previously been paid attention in scientific research.
Keywords: higher education; women faculty; men faculty; gender gap; countries; normal distribution functions.

[es] Evaluación de la proporción de mujeres en el personal científico y pedagógico: datos de los países modernos

Resumen: Introducción. Actualmente, la educación superior es importante en la formación de especialistas altamente calificados, la creación de nuevos conocimientos, la introducción de innovaciones. **Objetivo.** El propósito de nuestro estudio fue evaluar los indicadores que caracterizan la estructura de género del personal científico y pedagógico en instituciones de educación superior de varios países. Estos indicadores eran la proporción de maestras en el número total de maestros de instituciones de enseñanza superior. **Metodología.** Se utilizaron datos del Instituto de Estadística de la UNESCO para 107 países. Utilizamos las funciones de densidad de la distribución normal como modelos. **Resultados.** Los resultados del experimento computacional mostraron que la proporción de personal docente femenino en el número de personal científico y pedagógico en promedio en los países considerados era del 41,6%. Las mujeres constituyen más de la mitad del personal docente en veinticuatro países. El predominio de los hombres como maestros en las instituciones de educación superior se registró en setenta y ocho países. Se determinaron los países con los valores máximos y mínimos de indicadores tales como la proporción de maestras en el personal científico y pedagógico. Se demostró una diferencia significativa para los grupos de países con valores máximos y mínimos de indicadores. **Contribución.** El enfoque metodológico propuesto y los resultados obtenidos tienen una novedad científica, ya que la evaluación de las características territoriales de la estructura de género de los docentes de las instituciones de educación superior no ha recibido previamente atención en la investigación científica.
Palabras clave: educación superior; profesorado femenino; profesorado masculino; brecha de género; países; funciones normales de distribución.

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1. Introduction

In modern national economies, the higher education system plays an essential role in the training of highly qualified specialists, the creation of new knowledge, and the introduction of innovations. Since higher education has received significant development in the last decade, there is an increase in the number of students in most countries and, accordingly, an increase in the number of scientific and pedagogical staff (Why have universities, 2020).

In the twentieth century, as the statistics presented in the UNESCO report (UNESCO Institute for Statistics, 2020) show, there was an absolute predominance of the proportion of male teachers in the total number of staff of higher educational institutions. So in 1975, about 70% of the scientific and pedagogical staff of higher education institutions in the world were men. By the end of the century (in 2000), the national average value of this indicator slightly decreased and amounted to 62%. At the beginning of the twenty-first century, the downward trend in the proportion of men faculty continued, which was reflected in a number of scientific publications (for example, Sussman, Yssaad, 2005; LaPan et al., 2013; Harford, 2018).

Our research was devoted to the assessment of existing gender differences in the structure of the research and teaching staff of the higher education system in modern national economies. The study of the existing differences is important both for national governments, public organizations, teachers of higher education institutions, and directly for potential teachers. Our article responds to the calls made in a number of scientific publications (for example, Taylor et al., 2010; Machado-Taylor, Ozkanlı, 2013; Hartley, Dobele, 2009; Easterly, Ricard, 2011), to study the existing features of the distribution by gender groups of teachers teaching students in higher education programs.

Despite the existence of studies on the gender structure of teachers working in the higher education system, not enough attention has been paid to the country-specific features of studying this problem so far. The presence of organizations in the countries that train students in the relevant programs, as indicated in the works (Abel, Deitz, 2011; Ciriaci, 2014), increases their attractiveness, positively affects economic growth and, most importantly, ensures the retention of school graduates in the labor markets. All this determines the increased interest in studying the country features of the ratio of the number of women faculty and men faculty working in higher educational institutions. Taking this into account, it seems appropriate to conduct a comparative analysis of the existing relative (specific) indicators characterizing the achieved level of feminization of faculty in different countries.

The purpose of our study was to evaluate the indicators that characterize the gender structure of scientific and pedagogical personnel in the higher education system of modern countries. Our article is aimed at obtaining a certain empirical and methodological contribution to the knowledge about the share of female scientific and pedagogical staff in the total number of teachers. This contribution consists in the fact that the author's method of modeling the assessment of the corresponding indicators for different countries using the density functions of the normal distribution is proposed. The empirical contribution is related to the answers to the following research questions:

RQ1. What is the average level of the proportion of women faculty in the whole amount of science-pedagogy staff in higher education institutions in modern countries?
RQ2. In how many countries is there an excess of the share of men faculty compared to the share of women faculty and vice versa?
RQ3. What are the ranges of the proportion of women faculty in the whole amount of science-pedagogy staff in higher education institutions in most of the countries under consideration?
RQ4. In which countries are the minimum and maximum values of the proportion of women faculty in the whole amount of science-pedagogy staff in higher education institutions noted?
RQ5. What are the levels of intergroup variance of indicator values, as well as variances for groups of countries with their maximum and minimum values?

The structure of this work is given below. The next section presents an overview of scientific publications of recent years that characterize such an aspect of higher education as the gender structure of teachers. The methodology, initial data and design of the study described in our article are presented below. The following sections present the simulation results and their discussion. The last sections contain conclusions and bibliographic references.

2. Literature review

In modern states, there is a gender gap in the number of scientific and pedagogical staff of higher education institutions. The majority of countries are characterized by the predominance of men faculty compared to women faculty. The lower representation of women as teachers of higher education institutions compared to

men has been indicated in such scientific publications of recent years as (Sugimoto, 2013 ; Santos, Dang Van Phu, 2019; Misra, 2011; Terosky et al., 2014). According to the author of the article (Yonghong Jade Xu, 2008), the low proportion of women faculty is especially characteristic of such areas of education as science, technology, engineering and mathematics (STEM). In some countries, for example, in Russia, the opposite trend is observed, that is, the predominance of women in the number of scientific and pedagogical staff (Rudakov, Prakhov, 2021). Currently, in the Chinese higher education system, the proportion of women and men in the research and teaching staff is approximately the same (Tang, Horta, 2021). Thus, the analysis of the literature allows us to conclude that there is a differentiation of gender characteristics in the higher education systems of modern countries.

Scientific publications indicate that in a number of countries where men predominate in the structure of scientific and pedagogical personnel, political and organizational measures are being implemented to reduce the existing gender gap and increase the proportion of women working as teachers (Murgia, Poggio, 2018; Jorge et al., 2016; De Angelis, Gruning, 2020). For example, in studies (Walker et al., 2020; Brower, James, 2020) it is shown that the implementation of the developed measures in New Zealand universities will allow achieving parity in the proportion of women faculty and men faculty by 2030.

According to many researchers, the predominance of men faculty in the higher education system compared to women faculty is due to both objective and subjective reasons. To objective reasons include large domestic responsibilities of women, the need to care for children and elderly relatives (Sege et al., 2015; Lundberg, Stearns, 2019; Mairesse, Pezzoni, 2015; Ferriman et al., 2009; Sieverding et al., 2018). According to the authors of publications (Adamo, 2013; Wolfinger et al., 2008; Heijstra et al., 2017), it is quite difficult for women to build their career in many universities due to difficulties in combining teaching and family responsibilities. Therefore, some women stop their teaching activities and move to other areas of the economy (Fernández-Carvajal, Sequeira-Rovira, 2015; Mason et al., 2013). Subjective reasons are associated with the presence of traditional prejudices in a number of countries, which, despite the formal legislative equality of women and men, make it difficult for them to fully participate in scientific and teaching activities (Gberevbie et al., 2014).

It should be noted that the presence of gender differences in the structure of scientific and pedagogical personnel, as shown by the results of scientific research, is not related to the geographical location of countries. That is, they are typical for countries located in different parts of the world (Europe, Asia, North and Latin America). This is confirmed by such publications as (Goastellec, Pekari, 2013; Aiston, Jung, 2015; Fox, 2018; Peng et al., 2017). Similar conclusions about the absence of a connection between the income of the population and gender differences in the specific weights of men and women faculty are given in the articles (Yenilmez, 2016; Yousaf, Schmiede, 2017). The high responsibility characteristic of women in the performance of their academic duties is emphasized in the study (Guarino, Borden, 2017).

Considering the gender aspects of the teaching staff, it is necessary to take into account the presence of certain sectoral features. We are talking about a relatively low proportion of women teaching training courses on STEAM. Attention is drawn to this in the article (Casa et al., 2020). A number of studies draw attention to the commitment of many universities to the policy of gender equality not only in the positions of professors (Lipton, 2017), but also in the leadership (Ehrenberg et al., 2012).

3. Methodology and design

The research process included five stages. At the first stage, the initial data describing the proportion of women faculty in the whole amount of science-pedagogy staff in higher education institutions in different countries were formed. At the second stage, we evaluated the distribution of indicator proportion of women faculty by regions based on the development of mathematical models. At the third stage, the average value of indicators for countries were determined, as well as the range in which the values of this indicator are located for most of them. At the fourth stage, the regions that were characterized by the maximum and minimum values of indicator were identified. At the fifth stage, intra-group variances were compared for groups of countries with minimum and maximum values, respectively, as well as the calculation of the inter-group variance based on the ANOVA method.

The study used empirical information from the UNESCO Institute for Statistics for 107 countries. At the same time, the data for the countries under consideration correspond to the period 2016-2020 (UNESCO Institute for Statistics, 2020).

In our study, four hypotheses were tested, which follow from the analysis of previously performed publications considered in the literature review section. These hypotheses are given below:

hypothesis 1 - there is a gender gap in the number of women faculty and men faculty in most modern countries;

hypothesis 2 - currently, there is a significant differentiation of indicators characterizing the share of women in the total number of scientific and pedagogical staff across countries;

hypothesis 3 - countries characterized by the maximum and minimum values of the share of women faculty in the number of research and teaching staff have different geographical locations;
hypothesis 4 - the countries characterized by the maximum and minimum values of the share of women in the number of scientific and teaching staff differ in terms of the level of income of the population.

The evaluation of the values of the considered indicators was carried out on the basis of economic and mathematical modeling of the initial empirical data. As a model, we used the density function of the normal distribution, the methodology of development for estimating the values of relative indicators was proposed by the author. Some aspects of the use of the methodology are given in the works (Pinkovetskaia, Slepova, 2018; Pinkovetskaia et al., 2021). During the development of the function, the initial empirical data were grouped according to the ranges of changes in the values of the indicators. These data groups can be geometrically represented in the form of a corresponding histogram. Data approximation using normal distribution function was carried out on the basis of generally accepted statistical methods. It is important to note that the average value of the considered indicator for countries, as well as standard deviation for the density function of the normal distribution, was displayed in the formula of the developed function. Therefore, by constructing a specific function, we get the specified parameters of the considered indicator without additional calculations.

The general form of the density function of the normal distribution is as follows:

$$y_1(x_1) = \frac{A}{\sigma \times \sqrt{2\pi}} \cdot e^{\frac{-(x_1 - m)^2}{2 \times \sigma \times \sigma}} \quad (1)$$

where:
x_1 - the indicator whose distribution we are studying;
m - the average value of the indicator for all observed objects;
σ - the mean square (standard) deviation.

The resulting function allowed us to determine the average value of the indicator for the countries under consideration, as well as the range of its change, that characterize most countries. In addition, the study identified countries in which the values of the indicator have values above the upper and below the lower limits of the range. The limits of the range of indicators for 68% of countries were determined based on the average value of the indicator and its standard deviation. The lower bound of the interval is equal to the difference between the mean and the standard deviation, and the upper bound is equal to their sum.

4. Modeling and results

During the computational experiment, economic and mathematical modeling was carried out on the basis of empirical data. The model describing the distribution (y_2) of the indicator (x_2) for the countries under consideration is as follows:

$$y_2(x_2) = \frac{1003.13}{12.82 \times \sqrt{2\pi}} \cdot e^{-\frac{(x_2 - 41.57)^2}{2 \times 12.82 \times 12.82}} \quad (2)$$

We checked the quality of the approximation of the initial data using the function (2) using the following criteria: according to Kolmogorov-Smirnov, Pearson and Shapiro-Wilk. The calculated values of the criteria are shown in Table 1.

Table 1. Calculated values of criteria

Indicators	Criteria		
	The Kolmogorov-Smirnov test	The Pearson test	The Shapiro-Wilk test
the proportion of women faculty in whole amount science-pedagogy staff in higher education institutions	0.05	3.41	0.96

Source: The data in the table is based on the calculated function (2).

The information given in column 2 of Table 1 showed that all the calculated values are less than the critical value according to the Kolmogorov-Smirnov criterion (0.174) at a significant level equal to 0.05. The data in

column 3 is less than the critical value of the Pearson criterion (9.49). The data in column 4 exceeds the critical value of 0.93 of the Shapiro-Wilk criterion at a significant level of 0.01. Thus, the computational experiment showed that the developed function has a high quality.

At the next stage of the study, the values of indicators characterizing the gender structure of scientific and pedagogical personnel working in the higher education system of the countries under consideration were determined. The value of the indicator, the average for countries, is shown in column 2 of table 2. The average value was determined based on the developed function (2). The standard deviation is indicated in the third column. The values of the indicators characterizing the upper and lower boundaries of the intervals corresponding to the majority of countries are shown in column 4. We calculate the lower bound as the difference between the mean and the standard deviation, and we calculate the upper bound as the sum of the mean and the standard deviation.

Table 2. Level of feminization teachers, working in higher education institutions

Indicator numbers	Average values	Standard deviation	Values for most countries
1	2	3	4
the proportion of women faculty in whole amount science-pedagogy staff in higher education institutions	41.57	12.82	28.75- 54.37

Source: The calculations were performed by the author on the basis of the normal distribution function (2).

5. Discussion

The country's average value of the share of women in the total number of scientific and pedagogical staff of higher education institutions was 41.6%. That is, on average, four out of every ten teachers in the countries under consideration were women. In most countries, the values of indicators characterizing the proportion of women faculty ranged from 25.8% to 54.4%. It is interesting to note that the average share of women faculty in the total number of teachers lags behind the share of women in the number of students who are receiving higher education, which by 2010 in most countries exceeded 50% (Barro, Lee, 2010).

The analysis of empirical data showed that at present, in most of the countries under consideration, there was a tendency for men to predominate among the research and teaching staff. So, based on the data in Table 2, the average value of the proportion of men faculty was 58.4%. The number of men faculty was higher compared to the number of women faculty in seventy-eight countries: Togo, Burkina Faso, Niger, Cote d'Ivoire, Senegal, Rep. Congo, Burundi, Benin, Cambodia, Rwanda, Cameroon, Ghana, San Marino, Bangladesh, Jordan, Morocco, Mozambique, Bhutan, Tanzania, Kenya, Peru, Islamic Rep. Iran, Madagascar, Qatar, Greece, Oman, Switzerland, Rep. Korea, Luxembourg, Malta, Singapore, United Arab Emirates, Italy, Liechtenstein, Tajikistan, Colombia, El Salvador, Cabo Verde, Bahrain, Germany, Lao PDR, Austria, India, Saudi Arabia, Slovenia, Botswana, Cyprus, Hungary, Indonesia, Algeria, Costa Rica, Denmark, Dominican Republic, Namibia, Poland, Spain, Turkey, Uzbekistan, Bosnia and Herzegovina, Honduras, Portugal, Sweden, United Kingdom, Brazil, Netherlands, North Macedonia, Samoa, Slovak Republic, Turkmenistan, Canada, Belgium, Brunei Darussalam, Serbia, Vietnam, Croatia, Estonia, Montenegro, Seychelles. The share of female teaching staff in higher education institutions was more than half in twenty-four countries: Belize, Monaco, Romania, Finland, Philippines, Grenada, Lesotho, Sri Lanka, Malaysia, Puerto Rico, Azerbaijan, Latvia, Lithuania, Albania, Georgia, Moldova, Thailand, Armenia, Cuba, Mongolia, Belarus, Russian Federation, Kyrgyz Republic, Kazakhstan. The approximate equality of the number of male teachers of female teachers was in five countries: Andorra, Bulgaria, New Zealand, Panama, United States. Consequently, the first hypothesis was confirmed that in most countries there was a gender gap among teachers teaching students in higher education programs.

The data in the second table allows us to analyze the degree of variation in the values of indicators for the countries under consideration. For this purpose, we used the mean and standard deviation specified in columns 2 and 3 of this table. The index of variation for the indicator under consideration was significant - 31%. That is, the second hypothesis was confirmed.

The next step was to identify the countries in which the maximum and minimum values of the indicator were marked. In this case, the maximum values are those that exceed the upper limit of the range specified in column 4 of Table 2, and the minimum values are those that are less than the lower limit of the range. The results of this analysis are shown in Table 3. Along with the list of countries, this table also shows the values of indicators by country, as well as the geographical location of countries and the level of income of the population in them. The income level of the population for each of the countries indicated in the table is given in accordance with the classification proposed in the project (Global entrepreneurship monitor, 2021).

Table 3. Characteristics of the countries where the maximum and minimum indicators were noted

Indicator	Country	Geographical location	Income of the population
1	2	3	4
the proportion of women faculty in whole amount science-pedagogy staff in higher education institutions	With maximum values of indicators		
	Puerto Rico, 55%	Latin America	High
	Azerbaijan, 56%	Europe	Low
	Latvia, 56%	Europe	High
	Lithuania, 56%	Europe	High
	Albania, 57%	Europe	Low
	Moldova, 57%	Europe	Low
	Thailand, 57%	Asia	Medium
	Georgia, 57%	Europe	Low
	Armenia, 59%	Europe	Low
	Cuba, 59%	Latin America	Low
	Mongolia, 59%	Asia	Low
	Belarus, 61%	Europe	Medium
	Russian Federation, 62%	Europe	Medium
	Kyrgyz Republic, 64%	Asia	Low
	Kazakhstan, 66%	Asia	Medium
	With minimum values of indicators		
	Togo, 6%	Africa	Low
	Burkina Faso, 9%	Africa	Low
	Niger, 10%	Africa	Low
	Côte d'Ivoire, 12%	Africa	Low
	Senegal, 12%	Africa	Low
	Rep. Congo, 13%	Africa	Low
	Burundi, 14%	Africa	Low
	Benin, 20%	Africa	Low
	Cambodia, 20%	Asia	Low
	Rwanda, 21%	Africa	Low
	Cameroon, 23%	Africa	Low
	Ghana, 23%	Africa	Low
	San Marino, 23%	Europe	High
	Bangladesh, 27%	Asia	Low
	Jordan, 27%	Asia	Low
	Morocco, 27%	Africa	Low

Source: The calculations were performed by the author on the basis of table 2.

An analysis of the information presented in table 3 (column 3) showed that there is no connection between the maximum and minimum values of indicators and the geographical location of countries. That is, the countries with the maximum and minimum values of indicators are located in different parts of the world. Thus, we can state the confirmation of the third hypothesis.

The data shown in table 3 (column 4) showed that there is no connection between the maximum values of indicators and the income of the population in the respective countries. That is, the countries with the highest values of indicators are characterized by both high and medium and low incomes of the population. A certain relationship was found between the countries with the minimum values of indicators and the income of the population in these countries. The absolute majority of countries with minimal values of indicators (with the

exception of San Marino) are characterized by low incomes of the population. Thus, we can state that the fourth hypothesis has been confirmed in countries with the highest values of indicators. For countries with minimal values of indicators, it was partially confirmed, since in most of these countries there is a low level of income.

Then the so-called ANOVA analysis was carried out. At the same time, two groups of countries were compared, respectively, with the maximum and minimum values of the indicators, the lists of which were given in Table 4. The results of the ANOVA analysis are shown in Table 4. It contains statistical estimates for each of these groups of countries. At the same time, the first and second rows of the table show, respectively, the average values of indicators for groups of countries with maximum and minimum values. The third and fourth lines show the variances for each of the groups of countries, respectively, with the maximum and minimum values of the indicators. The following lines show the cross-group estimates for groups of countries.

Table 4. Statistical characteristics describing groups of countries

№	Statistical characteristics	Indicators by country
1	Average for countries with the maximum values of indicators, %	49.13
2	Average for countries with minimum values of indicators, %	17.94
3	Variance by countries with maximum values	10.35
4	Variance by countries with minimum values	49.12
5	Variance between groups of countries with maximum and minimum values	12884.91
6	Fischer criterion	423.72
7	Critical value according to the Fisher criterion	4.84
8	Significance level	less than 0.001

Source: Calculated by the author on the basis of indicators by country.

An analysis of the data presented in table 4 shows that for groups of countries characterized by maximum and minimum values of indicators, relatively small variances are noted within each group. This shows that each of these groups includes countries with similar values of indicators.

The average for the group of countries with the maximum values of indicators differs significantly from the average for the group of countries with the minimum values. The variance between the groups of countries with the maximum and minimum values is much greater than the variance characteristic of each of the groups. Thus, the data shown in table 4 show that there is a significant difference in indicators between the groups of countries with maximum values and minimum values. The statistical characteristics of the ANOVA analysis based on intergroup differences showed the high quality of the estimates obtained. This is because the calculated statistics of the Fisher criterion significantly exceed the critical value for this criterion and the p-value is less than 0.001. Thus, we concluded that the inter-group variance of the values of indicators for groups of countries with their maximum and minimum values is much greater than the variances characteristic of each of these groups.

All of the above suggests that there are significant persistent differences between groups of countries with maximum and minimum values of the indicator reflecting the proportion of women working as university teachers. Consequently, the social role of women belonging to the teaching staff in these groups of countries is very different. This gender inequality has an impact on the perspective of women's participation in academic activities of the groups of countries under consideration.

6. Conclusions

In general, it should be noted that our research makes a number of important contributions to the knowledge of the territorial features of the gender structure of research and teaching staff in the higher education system. The purpose of our study was to evaluate the indicators characterizing the proportion of women faculty in the whole amount of science-pedagogy staff in higher education institutions in different countries. The conclusions that have scientific novelty and originality are given below.

In the course of the study, a method was proposed for evaluating indicators characterizing the gender structure of teachers in the higher education system using the density function of the normal distribution. Based on the proposed methodology, the distribution of indicators for 107 countries was estimated. The results of the computational experiment allowed us to obtain the following answers to the research questions posed:

- on average, in the countries under consideration, the share of women among the scientific and pedagogical staff of higher education institutions is 41.6%;
- in most countries, the share of women among the scientific and pedagogical staff varied in the range from 25.8% to 54.4%;
- the excess of the share of men faculty compared to the share of women faculty was observed in seventy-eight countries, the opposite trend was in twenty-four countries, gender equality was noted in five countries;
- the maximum values of the proportion of women faculty in whole amount of science-pedagogy staff in higher education institutions were in Puerto Rico, Azerbaijan, Latvia, Lithuania, Albania, Moldova, Thailand, Georgia, Armenia, Cuba, Mongolia, Belarus, Russian Federation, Kyrgyz Republic, Kazakhstan. The minimum values of the indicators were noted in Togo, Burkina Faso, Niger, Côte d'Ivoire, Senegal, Rep. Congo, Burundi, Benin, Cambodia, Rwanda, Cameroon, Ghana, San Marino, Bangladesh, Jordan, Morocco.

The results obtained as a result of the study allow us to state that the role of women in teaching students in higher education programs is quite significant. In most countries, the social status of women university teachers is high and continues to grow. The gender inequality that took place in the twentieth century is being overcome in economically developed countries, as well as in many developing countries. This trend, in our opinion, confirms the conclusions expressed earlier in the article (Winchester, Browning, 2015).

The practical significance of the study for governments is to take into account the gender and country characteristics of the scientific and pedagogical staff of higher education. The results of the work can be used in the activities of state and public organizations related to supporting gender equality in higher education institutions, when justifying measures to improve these activities. The new knowledge gained is of interest and can be used in the educational process at universities.

The study had limitations, as it was based on statistical information about only 107 countries. Further research can be aimed at establishing gender characteristics that characterize the structure of students of higher educational institutions in different countries.

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