



Journal Website:  
<https://theusajournals.com/index.php/ijmef>

Copyright: Original content from this work may be used under the terms of the creative commons attributes 4.0 licence.

## DYNAMICS AND PROSPECTS OF DEVELOPMENT IN THE FIELD OF HIGHER EDUCATION SERVICES

Submission Date: August 20, 2024, Accepted Date: August 25, 2024,

Published Date: August 30, 2024

Crossref doi: <https://doi.org/10.37547/ijmef/Volume04Issue08-05>

**Mamatov Akhmetjon Atajanovich**

Doctor Of Economic Sciences, Tashkent State University Of Economics, Uzbekistan

**Mamatov Mamajan Ahmadjonovich**

Phd Associate Professor Tashkent State University Of Economics, Uzbekistan

**Mamatova Dilnoza Bekpulatovna**

Phd Associate Professor Tashkent State World Language University, Uzbekistan

### ABSTRACT

The development of the higher education system in the Republic of Uzbekistan, as well as the growth of higher education services in the volume of gross services and gross domestic product, its dynamics are analyzed and forecasts are developed on its basic, inertial and mobilization perspectives.

### KEYWORDS

Higher educational institutions, educational services, educational services market, competition, gross domestic product, gross services, forecasting, exponential smoothing method, regression equation.

### INTRODUCTION

The economy of the 21st century has been characterized by several trends along with potential changes and developments that are shaping the way we live and work. This is not only due to the modern technological revolution and the genesis of new

technological structures, but also to the qualitative changes affecting the person himself (needs, motives, goals, etc.) and the content with his work. The development of knowledge on intensive production led to the acceleration of the transition from

reproductive industrial labor, which dominated the previous centuries, to mainly creative labor. These transformation processes gave rise to a change in the place and role of education in the economy. Education has long become a sphere of social production, in which the main resource and potential for human creativity development have been formed.

The basis of the decree of the President of the Republic of Uzbekistan dated October 8, 2019 "On approval of the concept of the development of the higher education system of the Republic of Uzbekistan until 2030" - number PF 5847 [1], the concept of the development of the higher education system of the Republic of Uzbekistan until 2030 was adopted. The concept is aimed at improving the quality of education, training competitive personnel, and effective organization of scientific and innovative activities based on the needs of the social sphere and economic sectors, ensuring the solid integration of science, education and production.

This is the aspect which President of the Republic of Uzbekistan Sh.M. Mirziyoev specifically mentioned with the following points: 65 academic lyceums will be transferred to higher education institutions in order to strengthen the cohesion between universities and lower levels of the educational system. Also, 187 technical schools will be attached to related universities and network enterprises in their field [2]. A distinctive feature of this strategy is the development of public-private partnership in the field of higher

education, the establishment of branches of state and non-state HEIs in the regions, including the branches of prestigious foreign HEIs.

The educational service budget is the demand for educational services of the main economic entity (individual, household, household and organization, state) and the provision of this service by the general educational organization is considered as a basic requirement, and these higher education services contribute to the national economy and its determining and assessing the impact on the gross services sector is of urgent importance.

## REVIEW OF LITERATURE

The scientific-theoretical basis of increasing the volume and quality of higher education services, training competitive personnel, effective organization of scientific and innovative activities on the basis of ensuring a solid integration of education and production, foreign scientists B.A.Lundvall, J.K.Galbraith, R.Nelson, G.B. Klyder, D. Mandel, K. Freeman and other scientific research works can be cited.

Among the Russian scientists are A. A. Porokhovskiy, Yu. P. Anisimov, S. Yu. Glazev, O. G. Golichenko, A. A. Dinkin, Beketov. V., Yu. V. Erigin, B. N. Kuzik, N. I. Ivanov, V. M. Polterovich, I. V. Shevchenko, Yu. V. Yakoves and others have conducted research on this topic.

Scientific-theoretical aspects of improving the volume and quality of higher education services, training

competitive personnel, effective organization of scientific and innovative activities on the basis of ensuring a solid integration of education and production in the Republic of Uzbekistan. Toychieva O.M., Usmonov B.Sh., Shukurullaev U.U., Azizov S.R., Khudaynazarova D.Kh., Khojaev A.S., Djumaniyazov U.I., Nabiev D.A., Vakhobov A.V. and others can be distinguished in this field.

The concept of "network structure" in the higher education system was coined by B.A. Lundvall[3]. The interconnectedness of this concept determines the diversity of approaches to defining the nature of the network structure. A networked structure is governed by long-term single goals related to certain integration relations for the most efficient use of its resource potential. Network structures differ from traditional structures in almost all the basic principles of operation. The most important features that distinguish network structures from hierarchical and market structures in the higher education system and the first classification of the network structure, considered classical, were proposed by P. Miles and Ch. Snow [4].

According to Russian scientists S.L. Parfenov, considering higher education institutions, the structure of the educational network, formed by a set of organizations that implement educational projects together, is also aimed at building mutual cooperation with large scientific centers and the real sector of the economy. Such a network structure revealed that the

main form of interaction is a consortium of business communities and a cluster of higher education institutions, academic institutions and associations [5]. As reported by Professor Makoveev V.V. in higher education institutions, "integrative network structures are of special importance for establishing integrative relations among science, education and production, and the activities of its participants: fundamental research – REDW (research and experimental design work) - experimental production - mass production - sales" scientifically justified that it is aimed at covering the innovation cycle" [6].

Zufarova N.G., an economist from Uzbekistan. In higher education institutions, "universities are at the central link of mutual cooperation, and they are the main stems of innovations[7]. Among the young economists in our country, A.Sultanov, U.Djumaniozov and K.Khalmuratov paid special attention to public-private partnership as a form of branch structures in higher education institutions, and in their scientific work, bearing in mind public-private partnership based on the long-term strategic tasks and goals of the state, public-private partnership is a long-term strategic task of the state, and based on their goals, on the basis of various possible economic, political, social, cultural and considering other risks, dangers, risk distribution, with the private sector, extremely important socio-economic for the population, if necessary, projects and relations with the private sector are mutually beneficial

to build politically important objects, introduce innovations in the fields, and provide services" [8].

### RESEARCH METHODOLOGY

The article includes dialectical, systematic, integral and synergetic approaches, economic, logical, scientific abstraction, analysis and synthesis, modeling of economic processes and systems, induction and deduction, comparison, generalization, grouping, graphical econometric modeling, exponential smoothing method, regression equation methods were used.

### ANALYSIS AND DISCUSSION OF RESULTS

The higher education system is an important pillar that increases the country's national wealth and competitiveness. In accord with experience of developed societies, in order to ensure sustainable economic growth, 40-50 percent of the population should possess at least higher education, and in the knowledge economy, the percentage of highly educated people reaches 60 percent. In this regard, the President emphasized the following: improving the quality of education is the only correct way of development of the new Uzbekistan [9]. Particularly, in the concept of development of the higher education system of the Republic of Uzbekistan until 2030, raising the process of training independent-thinking, highly qualified personnel with modern knowledge and high moral and ethical qualities to a new level in terms of quality, modernization of higher education the task of

developing the social sphere and economic sectors based on advanced educational technologies.

The development of stable market relations in our country is inextricably linked with the emergence and development of the educational services market. Formation of the educational services market is a complex process. Understanding education as a service and its entry into the market includes financial relations between the subjects of the market of educational services. Education will become a separate service sector of the market, and the tax-paying citizen will receive the right of a customer, demanding the improvement of the quality of the services provided, taking into account the needs of consumers and their legal representatives.

As competitive factors in the market of educational services, the standard of living, the structure of employment, the rate of development of socially important fields and practices, etc. can be cited. Educational services are exchanged in the market as a type of market service, which is understood as a set of existing and potential buyers and sellers of goods. The educational services market is the demand for educational services of the main economic entities (individuals, households, enterprises and organizations, the state) and their delivery by various educational organizations, considered as an interacting market.

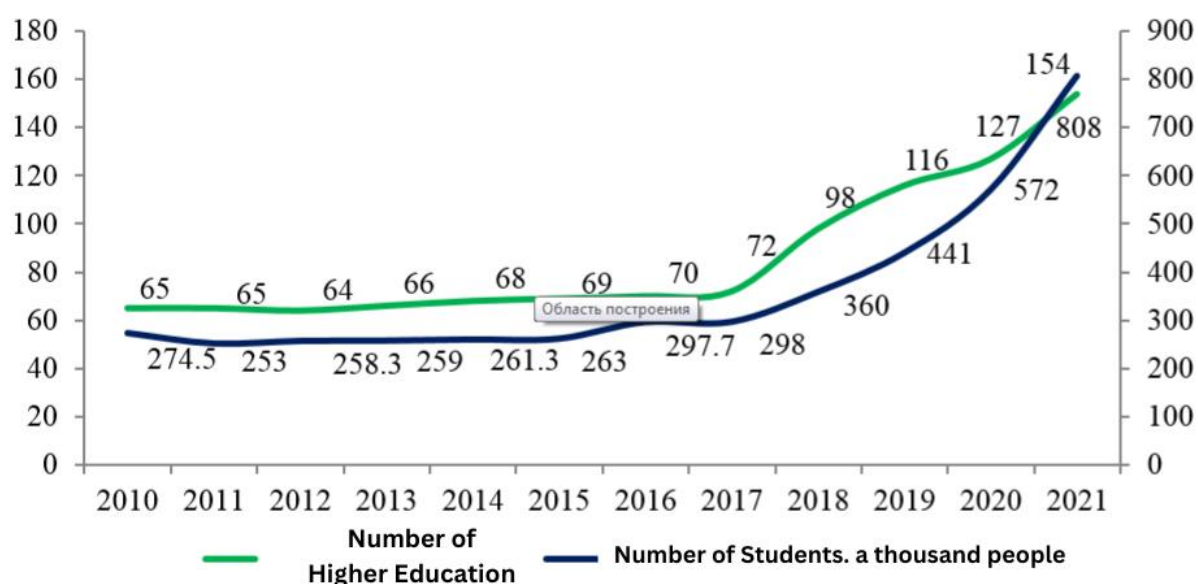
In modern market conditions, the nature of the relationship between the citizen and the state is

changing. Education becomes a service sector, and the tax-paying citizen takes the right of the customer and demands the improvement of the quality of the services provided, taking into account the needs of consumers and their legal representatives.

Currently, higher education institutions in the Republic, which have been granted financial freedom, are competing with each other in the rival for students, because the choice of legal representatives can provide educational conditions that meet the new

state educational standards and provide various quality educational services, aimed at educational organizations that can provide

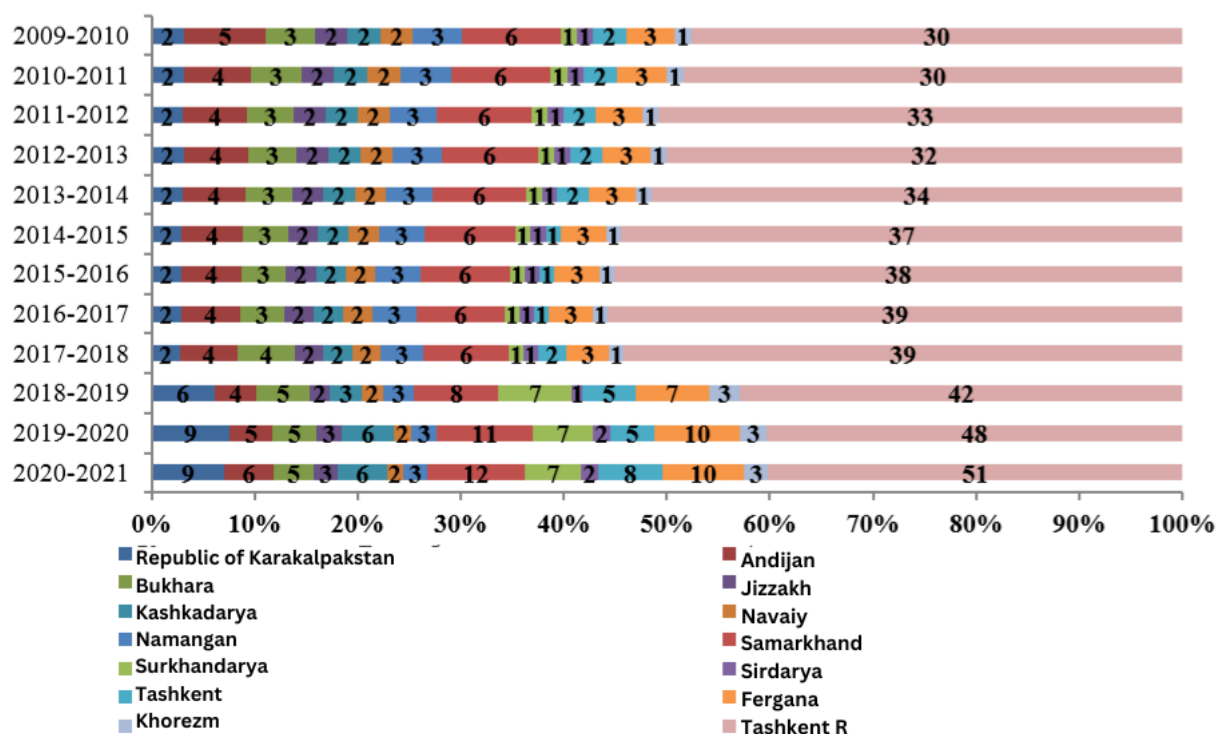
The number of higher education institutions in the republic was 154 in 2021, and by 2022 there will be a total of 186, including 34 universities, 48 institutes, 3 academies, 27 branches, 1 conservatory, foreign 31 branches of the national higher education institution and 42 non-state higher education institutions are operating[10].



Picture 1. Dynamics of the number of higher education institutions in the Republic of Uzbekistan (2010-2021).

The number of republican higher education institutions increased from 65 in 2010 to 154 by 2021, and the number of students studying in them increased by

almost 3 times to 808,000. In 2012, the number of higher education institutions in Tashkent decreased by 1.



Picture 2. Dynamics of the number of higher education institutions in the regions of the Republic of Uzbekistan

It can be seen that the increase in the number of higher education institutions operating in the republic has increased from year to year, which corresponds to the general market trend, and the leader in the ranking of the number of higher education institutions by region is the city of Tashkent, in 2021 there are 51 higher education institutions in it, which is 40.2% . In the Samarkand region - 12 (9.4%), in the Fergana region - 10 (7.9%), in the Republic of Karakalpakstan - 9 (7.1%), and in the Syrdarya and Navoi regions - 2 higher education institutions. is 1.6% compared to the total number.

When looking at a number of important aspects in the field of education, it has become the foundation for human development and technological changes of the economy, it provides the regions with labor force, on the other hand, it helps to develop the competitiveness of the subjects of the Republic. Econometric models were used to analyze the position of higher education services in the service sector. Modeling and forecasting of socio-economic processes in the conditions of the market economy is the scientific knowledge of the past, the future based on the development laws and trends of the present time,

and the determination of future development goals and objectives. Forecasting is of great importance in the theory and practice of managing the country's economy. This science serves as a basis for choosing management solutions, determines ways of influencing economic processes in the present to achieve future goals.

"Forecasting" has been chosen as another stage of the process of regulating the economy or part of the development of the economic and social development program of the country. At the same time, it is a relatively independent science, distinguished by several characteristics: firstly, forecasts are not directive in nature, their quantitative estimates are mainly probabilistic in nature, they are aimed at identifying development problems that have occurred on a large scale and looking for ways to solve them. In our research, we used the exponential smoothing method to determine the future share of higher education services in the service sector and in the GDP of the Republic. According to Allen L. Webster, the use of moving average series, exponential smoothing, and linear trend equations in time series smoothing shows the necessity of using linear regression trend equations in time series forecasting [11].

There are various methods of time series smoothing and time based forecasting, the most commonly used are:

1. Method of extending the indicator period;
2. Average sliding method;

3. Exponential smoothing method;

4. Trend equations.

The method of extending the period of the indicator is carried out by calculating the weighted average within recent years for long periods and forecasting that average for the next period.

The exponential smoothing method is a method of smoothing time series based on the quantities of recent periods and the exponential parameter, and it is more convenient for developing predictions for the near future.

The formula for the exponential smoothing method is as follows:

$$y_{n+1} = y_n * \alpha + (1 - \alpha) * y_{n-1} \quad (1)$$

Where:  $y_{n+1}$  – smoothed or projected period information;

$y_n$  – current period information;

$y_{n-1}$  – basis (past) period observations.

$\alpha$  – exponential leveling parameter.

Exponential leveling parameter the following formula with is:

$$\alpha = \frac{2}{m+1} \quad (2)$$

As can be seen, depending on the size of  $\alpha$ , the severity of the previous observation decreases rapidly. The larger  $\alpha$  is, the smaller the effect of previous years. If  $\alpha$  is close to number one, only the influence of the last observations can be taken into account in this forecasting, and if it is close to zero, the weight measured at the time series levels will be

very slow. All previous periods and observations are taken into account in forecasting.

At this point, it should be said that in some literature, the data of the current and past periods are presented directly in absolute amounts, while in some literature, the current and past periods are arithmetically represented instead of the current data. The average amount, instead of the information of the previous period, the arithmetic average of the amounts of the previous and previous year is taken.

The average relative error (e) in the data obtained as a result of exponential smoothing is determined by the following formula:

$$\varepsilon = \frac{1}{n} * \sum_{i=1}^n \frac{|Y_{pr} - Y|}{Y} \quad (3)$$

\* 100

In the interpretation of the values to evaluate the forecast accuracy of the mean relative error, if  $\varepsilon$  is less than 10, the forecast accuracy is high, in the range of 10-20, the accuracy is good, in the range of 20-50, the accuracy is satisfactory, and when it is greater than 50 accuracy is considered unsatisfactory.

The trend method of forecasting is one of the most widespread methods, which is a linear trend equation in its simplest form, but in our research we used a regression equation in the form of a second order parabola. Because in the following years, due to the increase in the number of higher education institutions and the increase in the demand for higher

education services, there was a sharp increase in the service sector (Fig. 1).

$$Y = a + b \cdot t + c \cdot t^3 \quad (4)$$

Here: Y - result;

a, b, c - regression equation parameter;

t - time series

The values of a, b and c are found by using the least squares method to represent the system of equations.

$$\begin{cases} \sum y = n \cdot a + b \cdot \sum t + c \cdot \sum t^2 \\ \sum y \cdot t = a \cdot \sum t + b \cdot \sum t^2 + c \cdot \sum t^3 \\ \sum y \cdot t^2 = a \cdot \sum t^2 + b \cdot \sum t^3 + c \cdot \sum t^4 \end{cases} \quad (5)$$

The created equation (model) is evaluated according to the following criteria:

- a) Determination coefficient;
- b) Fisher criterion;
- c) Student standard;
- g) Darbin-Watson criterion;
- d) Approximation error.

Trend of models quality determination coefficient the following formula defined by :

$$D = R^2 = \frac{ESS}{TSS} \quad (6)$$

The value of the coefficient of determination is determined according to the Chedok scale, and according to it, it is between 0 and 1, and the result close to 0 means that the connection between the events is weak, 0 means that there is no connection at all, and 1 Close to .0 means that the association is very strong.

This where:  $D = R^2$ -determination coefficient;

ESS- value of random variation ( explained amount of squares);

TSS- total variation value ( total sum of squares ).

The statistical significance of the model is determined by Fisher's F-criterion (F):

$$F = \frac{ESS*(n-m-1)}{RSS*m}(7)$$

This where: n- number of observations;

m - factor number of variables ;

RSS - trend variation value ( residual sum of squares ).

The statistical significance of the regression coefficients is tested by Student's *t* test.

$$t_a = \frac{|a|}{s_a}(8)$$

$$S_a^2 = \frac{S_\varepsilon^2}{\sum_{i=1}^n (t_\varepsilon - t)^2}(9)$$

The accuracy of the model is calculated using the average relative error (A) of the approximation:

$$A = \frac{1}{n} * \sum_{i=1}^n \left| \frac{\varepsilon_i}{Y_i} \right| * 100(10)$$

There should be no autocorrelation between the time series values, which is checked using the Darbin-Watson criterion:

$$d = \frac{\sum_{i=1}^n (\varepsilon_i - \varepsilon_{i-1})^2}{\sum_{i=1}^n \varepsilon_i^2}(11)$$

The Darbin-Watson scale allows for a range of 0-4. It oscillates around 2.0 if there is no autocorrelation between the row values.

When the found value is checked by the table value, it has autocorrelation  $d_{real} < d_{low}$ , if it has autocorrelation,  $d_{real} > d_{high}$  if there is no autocorrelation,  $d_{low} < d_{real} < d_{high}$  then the check is continued.

Based on the developed model, a forecast for the coming years is prepared. In this case, the forecast indicators are required to be located in the upper and lower range of the forecast developed for the next period.

$$Y_{(t_0)} - t_{naz} \cdot S_{yx} \leq forecast\ indicator \leq$$

$$Y_{(t_0)} + t_{naz} \cdot S_{yx}(12)$$

Here:  $Y_{(t_0)}$  –current period information;

$t_{naz}$  –Theoretical value according to the Student criterion;

$$S_{yx} = S_\varepsilon^2 \left( \frac{1}{n} + \frac{(t_{n+1} + t)^2}{\sum_{i=1}^n (t_i + t)^2} \right) (13)$$

Table 1

Changes in country's GDP, volume of services and gross educational services in 2010-2021

| The year _ | Vol. of country's GDP, bln soums | Total services, bln soums | Higher education services, bln soums |
|------------|----------------------------------|---------------------------|--------------------------------------|
| 2010       | 78936.6                          | 31463.8                   | 1412.9                               |
| 2011       | 103232.6                         | 40529.1                   | 1682.1                               |
| 2012       | 127590.2                         | 50254.7                   | 2070.0                               |
| 2013       | 153311.3                         | 62099.2                   | 2459.7                               |

|                                        |          |          |         |
|----------------------------------------|----------|----------|---------|
| 2014                                   | 186829.5 | 73600.9  | 2917.3  |
| 2015                                   | 221350.9 | 86674.5  | 3435.4  |
| 2016                                   | 255421.9 | 99665.5  | 4034.9  |
| 2017                                   | 317476.4 | 116901.5 | 6057.8  |
| 2018                                   | 424728.7 | 147587.2 | 8292.6  |
| 2019                                   | 529391.4 | 204874.5 | 10616.6 |
| 2020                                   | 602193.0 | 233048.7 | 12043.9 |
| 2021                                   | 734587.7 | 283550.0 | 16020.1 |
| The change is 2021<br>compared to 2010 | 9.3      | 9, 1     | 11.3    |

Between 2010 and 2021, the country's GDP increased by 9.3 times, total services by 8.3 times, and higher education services by 11.3 times. Over the past 12 years, total services have increased more than higher education services, indicating that services in higher education have increased more than other types of services.

In our study, the number of observations is equal to the studied period, i.e. 12, and the exponential smoothing parameter is equal to  $\alpha = \frac{2}{12+1} = 0,15$ .

We will calculate in two options to develop forecast data for 2022-2026.

In the first option, the forecast amount is calculated as follows:

$$y_{n+1} = y_n * 0,15 + (1 - 0,15) * y_{n-1} \quad (14)$$

In the second option, the amount of the forecast is calculated as follows:

$$y_{n+1} = \frac{y_n + y_{n-1}}{2} * 0,15 + (1 - 0,15) * \frac{y_{n-1} + y_{n-2}}{2} \quad (18)$$

In our study, a forecast for the next nine years was made, (see table 2)

**Table 2**

**Forecast of higher education services of the country based on exponential texting, billion soums**

| years | higher education services, | Forecast amount based on absolute amount of current and past periods, option 1 | Forecast amount based on average amount of current and past periods, option 2 |
|-------|----------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
|-------|----------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------|

|           | billion soums,<br>$Y$ | $Y_{pr}$  | Average<br>relative error, $\varepsilon$ , % | $Y_{pr}$ | Average<br>relative error, $\varepsilon$ , % |
|-----------|-----------------------|-----------|----------------------------------------------|----------|----------------------------------------------|
| 2010      | 1412.9                |           |                                              |          |                                              |
| 2011      | 1682.1                |           |                                              |          |                                              |
| 2012      | 2070                  |           |                                              |          |                                              |
| 2013      | 2459.7                | 1740.3    | 29.2                                         | 1596.8   | 35.1                                         |
| 2014      | 2917.3                | 2128.5    | 27.0                                         | 1934.4   | 33.7                                         |
| 2015      | 3435.4                | 2528.3    | 26.4                                         | 2328.4   | 32.2                                         |
| 2016      | 4034.9                | 2995.0    | 25.8                                         | 2761.7   | 31.6                                         |
| 2017      | 6057.8                | 3525.3    | 41.8                                         | 3260.2   | 46.2                                         |
| 2018      | 8292.6                | 4338.3    | 47.7                                         | 3931.8   | 52.6                                         |
| 2019      | 10616.6               | 6393.0    | 39.8                                         | 5365.7   | 49.5                                         |
| 2020      | 12043.9               | 8641.2    | 28.3                                         | 7517.1   | 37.6                                         |
| 2021      | 16020.1               | 10830.7   | 32.4                                         | 9735.9   | 39.2                                         |
| 2022      |                       | 12640.3   |                                              | 11735.5  |                                              |
| 2023      |                       | 15513.1   |                                              | 14008.9  |                                              |
| 2024      |                       | 13071.3   |                                              | 13727.0  |                                              |
| 2025      |                       | 15146.9   |                                              | 13021.6  |                                              |
| 2026      |                       | 13382.6   |                                              | 13793.9  |                                              |
| 2027      |                       | 14882.2   |                                              | 13379.3  |                                              |
| 2028      |                       | 13607,5 _ |                                              | 13434.5  |                                              |
| 2029      |                       | 14691.0   |                                              | 13559.6  |                                              |
| 2030      |                       | 13770.1   |                                              | 13420.4  |                                              |
| Medium __ | 5920.3                | 8062, 5   | 33.2                                         | 7479.9   | 39.7                                         |

Due to the presence of "convex" amounts in the time series in option 1, the amounts of the next period of the forecasted time series are the same, and due to the

sliding time series in option 2, the amounts in the last forecast time series are the same.

Based on the above information, we have the following regression equations for forecasting economic processes with stable inertial dynamics:

By volume of higher education services:

$$\hat{Y}_x = 308,35 \cdot t^2 - 3018,3 \cdot t + 8184,7$$

Based on the developed regression equation, the quality, content and accuracy of the model were analyzed.

When the coefficients of determination are calculated based on the formula (6),  $R^2 = 0,89$  the value means that the time dependence is very strong and the time model is reasonable.

Using the formula (7), Fisher's F-criterion was calculated based on the data in Table 1. According to him,  $F = 386.9$  it was equal to A Fisher's F-test greater

than 4.75 indicates that the model is statistically significant.

The average relative error of the approximation of the model accuracy is found by the formula (10)  $A = \frac{1}{12} \cdot 64.5 = 5.38$  and is less than 10 percent, which indicates high model accuracy.

When analyzed by Darbin-Watson criterion (d) by formula (11), the number of observations is  $d_{real} = 1.41$  equal to 12, the factor is 1, and taking into account the Jalwal data, it  $d_{low} = 0.97$  can  $d_{high} = 1.33$  be said that there is no autocorrelation in the time series value. From the basic forecast indicators of higher education services, we can see that the volume of employees in higher education will increase by 106.9 percent in 2030 compared to 2021 (see Table 3).

Table 3

Dynamics of change of basic forecast indicators of higher education services

| Years | GDP, billion s<br>oum | Absolute<br>increase (decrease)<br>in s / | The rate of<br>increase (decrease) is in<br>% | The rate of<br>additional growth<br>(decrease) is in % | Significance<br>of $\frac{A_{\text{daz}}}{100} \cdot 1\%$<br>additional<br>growth |
|-------|-----------------------|-------------------------------------------|-----------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------|
|-------|-----------------------|-------------------------------------------|-----------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------|

|      |         | Basic method<br>( $Y_1 - Y_0$ ) | The chain is a similar method<br>( $Y_i - Y_{i-1}$ ) | Basic method<br>$\frac{Y_i}{Y_0} \cdot 100$ | The chain is a similar method<br>$\frac{Y_i}{Y_{i-1}} \cdot 100$ | Basic method<br>$P_b - 100\%$ | The chain is a similar method<br>$P_z - 100\%$ |                 |
|------|---------|---------------------------------|------------------------------------------------------|---------------------------------------------|------------------------------------------------------------------|-------------------------------|------------------------------------------------|-----------------|
| 1    | 2       | 3                               | 4                                                    | 5                                           | 6                                                                | 7<br>(5-100%)                 | 8<br>(6-100%)                                  | $\frac{2}{100}$ |
| 2021 | 16020   | -                               | -                                                    | -                                           | -                                                                | -                             | -                                              | -               |
| 2022 | 10663.6 | -<br>5356.4                     | -<br>5356.4                                          | 66.6                                        | 66.6                                                             | -33.4                         | -33.4                                          | 160.2           |
| 2023 | 11474.1 | -<br>4545.9                     | 810.5                                                | 71.6                                        | 107.6                                                            | -28.4                         | 7.6                                            | 106,636         |
| 2024 | 12283.8 | -<br>3736.2                     | 809.7                                                | 76.7                                        | 107.1                                                            | -23.3                         | 7.1                                            | 114,741         |
| 2025 | 13092.9 | -<br>2927.1                     | 809.1                                                | 81.7                                        | 106.6                                                            | -18.3                         | 6.6                                            | 122,838         |
| 2026 | 13901.4 | -<br>2118.6                     | 808.5                                                | 86.8                                        | 106.2                                                            | -13.2                         | 6.2                                            | 130,929         |
| 2027 | 14709.4 | -<br>1310.6                     | 808                                                  | 91.8                                        | 105.8                                                            | -8.2                          | 5.8                                            | 139,014         |
| 2028 | 15516.8 | -<br>503.2                      | 807.4                                                | 96.9                                        | 105.5                                                            | -3.1                          | 5.5                                            | 147,094         |
| 2029 | 16323.8 | 303.8                           | 807                                                  | 101.9                                       | 105.2                                                            | 1.9                           | 5.2                                            | 155,168         |
| 2030 | 17130.3 | 1110.3                          | 806.5                                                | 106.9                                       | 104.9                                                            | 6.9                           | 4.9                                            | 163,238         |

In our study, when determining the forecast of the volume of higher education services in the mobilization option, the amount allocated for higher education from the state budget, income from payment-contracts, and the amount of funds appropriated at the expense of republican grants and economic

contracts are taken into account. we analyzed the effect of the effect on educational services in the form of a rank function. In this case, the general regression equation took the following form:

Values of regression equation parameters<sup>1</sup>

|                  | coef.    | stn dev.  | t stat. | p value  |     |
|------------------|----------|-----------|---------|----------|-----|
| const            | 5,92358  | 0,452697  | 13,09   | 1,11e-06 | *** |
| state fund share | 0,408596 | 0,0998041 | 4,094   | 0,0035   | *** |
| pers.fund share  | 0,519774 | 0,0626965 | 8,290   | 3,38e-05 | *** |
| scholarships     | 0,113577 | 0,0310368 | -3,659  | 0,0064   | *** |

$$\ln Y_{TX} = 5,92 + 0,41 \ln X_{state fund} + 0,52 X_{pers.fund} + 0,11 X_{scholarships}$$

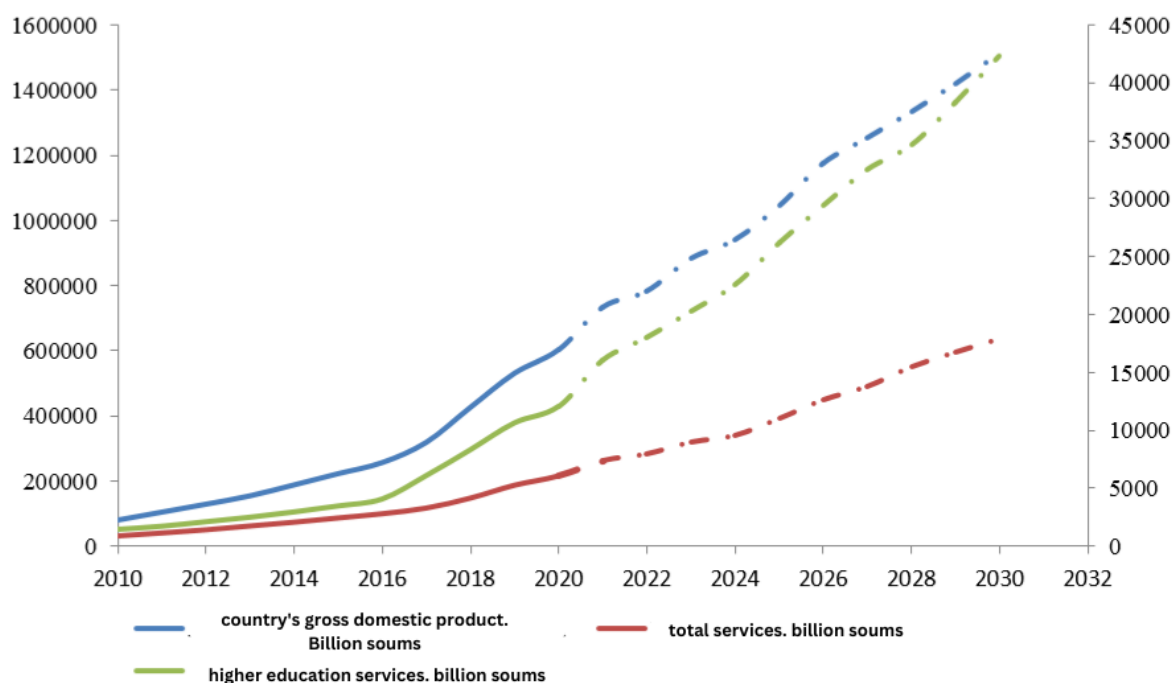
It can be seen that, according to the data of the regression equation, if other factors remain unchanged, increasing the amount allocated from the state budget by one percent will increase the volume of gross higher education services by an average of 0.41 percent, coming from the payment-contract account. an increase in the amount of income by one percent increases the volume of gross higher education services by 0.52 percent on average, and a one percent increase in the amount of funds allocated

to foreign grants and economic contracts at the Republic level increases the volume of gross higher education services leads to an average increase of 0.11 percent.

It can be seen that the amount allocated from the state budget to the volume of gross higher education services and the income from the payment contract have a significant impact on the increase in the volume of services in the field of gross education.

We determined the forecast values for the volume of higher education services until 2030 according to the developed model.

<sup>1</sup> Gretl based on statistics author development in the program



3 . GDP of the country, volume of total services and volume of higher education services forecasted in 2022-2030

From the graph in Figure 2, it can be seen that the growth of higher education services is faster than the country's GDP. This, in turn, is explained by the fact

that the price and quality of higher education services are in line with the wishes of consumers in the increase in the demand for educational services.

In our study, basic, inertial and mobilization forecasts of the volume of higher education services until 2022-2030 were developed.

Table 4

Forecast indicators of higher education services, billion soums

| Years | Basic   | Inertia | Mobilization |
|-------|---------|---------|--------------|
| 2022  | 10663.6 | 13942.0 | 18776.1      |
| 2023i | 11474.1 | 15176.1 | 24729.3      |
| 2024  | 12283.8 | 16410.2 | 27277.3      |
| 2025  | 13092.9 | 17644.3 | 34542.2      |
| 2026  | 13901.4 | 18878.4 | 44662.9      |
| 2027  | 14709.4 | 20112.5 | 53824.7      |

|      |         |         |         |
|------|---------|---------|---------|
| 2028 | 15516.8 | 21346.6 | 65321.9 |
| 2029 | 16323.8 | 22580.7 | 72407.3 |
| 2030 | 17130.3 | 23814.8 | 82994.0 |



Figure 4. Forecast indicators of basic, inertial and mobilization options of the volume of higher education services in 2022-2030

Table 5

The forecast value of higher education services is the share of the country's GDP and total services

| The year _ | The size of the country's GDP, billion soums | Of this, the share of higher education services , % |         |              | Total services, billion soums | Of this, the share of higher education services , % |         |              |
|------------|----------------------------------------------|-----------------------------------------------------|---------|--------------|-------------------------------|-----------------------------------------------------|---------|--------------|
|            |                                              | Basic                                               | Inertia | Mobilization |                               | Basic                                               | Inertia | Mobilization |
| 2022       | 782335.9                                     | 1.4                                                 | 1.8     | 2.4          | 304328.7                      | 3.5                                                 | 4.6     | 6.2          |
| 2023       | 883187.7                                     | 1.3                                                 | 1.7     | 2.8          | 347092.8                      | 3.3                                                 | 4.4     | 7.1          |
| 2024       | 940594.9                                     | 1.3                                                 | 1.7     | 2.9          | 377178.6                      | 3.3                                                 | 4.4     | 7.2          |
| 2025       | 1046733.6                                    | 1.3                                                 | 1.7     | 3.3          | 427067.3                      | 3.1                                                 | 4.1     | 8.1          |

|      |           |     |     |     |          |     |     |      |
|------|-----------|-----|-----|-----|----------|-----|-----|------|
| 2026 | 1175340.3 | 1.2 | 1.6 | 3.8 | 481889.5 | 2.9 | 3.9 | 9.3  |
| 2027 | 1251737.4 | 1.2 | 1.6 | 4.3 | 520722.8 | 2.8 | 3.9 | 10.3 |
| 2028 | 1333100.3 | 1.2 | 1.6 | 4.9 | 561235.2 | 2.8 | 3.8 | 11.6 |
| 2029 | 1419751.8 | 1.1 | 1.6 | 5.1 | 607653.8 | 2.7 | 3.7 | 11.9 |
| 2030 | 1482035.6 | 1.2 | 1.6 | 5.6 | 650613.6 | 2.6 | 3.7 | 12.8 |

By ensuring stable high growth rates in economic sectors, in the next five years, the gross domestic product per capita will be increased by -1.6 times (from \$1,750 to \$2,800), and by 2030, the per capita income will increase from 4,000 US dollars, and "countries with higher than average income" "creating the ground for entering the line is indicated in the Decree of the President of the Republic of Uzbekistan dated January 28, 2022 No. PF-60 "On the Development Strategy of New Uzbekistan for 2022-2026". As a result, it was determined that the share of higher education services in GDP will reach 5.6% and the share of total services in GDP will reach 43.9% according to the optimal option, that is, the mobilization forecast indicator .

## CONCLUSIONS

The number of republican higher education institutions was 65 in 2010, and by 2021 it has doubled to well over 154.

The increase in the number of higher education institutions operating in the republic has increased year by year, the leader in the ranking of the number of higher education institutions is the city of Tashkent. In 2021, there are 51 higher education institutions in it,

which is 40.2% , in the Samarkand region - 12 (9.4%), in the Fergana region - 10 (7.9%), in the Republic of Karakalpakstan - 9 (7.1%), in the Syrdarya and Navoi regions - 2 It is 1.6% of the total number of higher education institutions.

Between 2010 and 2021, the country's GDP increased by 9.3 times, total services by 8.3 times, and higher education services by 11.3 times. Over the past 12 years, higher education services have grown more than other types of services as part of total services.

According to the determined regression equation, if other factors remain unchanged, an increase in the amount allocated from the state budget by one percent increases the volume of gross higher education services by 0.41 percent on average, and the volume of revenue from payment-contracts by one percent. an increase in the volume of gross higher education services by 0.52% on average and an increase in the volume of funds allocated to foreign grants and economic contracts at the Republic level by one percent, the volume of gross higher education services by 0.11% on average leads to a percentage increase.

The volume of higher education services in the republic was analyzed using the exponential leveling method of the absolute amount and the average amount of the current and past periods, and the indicators of the future period were forecasted using the regression equation for forecasting economic processes with stable inertial dynamics. The forecast value in the inertial option showed that 2030 will increase by 148.7 percent compared to 2021. Based on the forecast indicators of higher education services, the dynamics of change will lead to a 106.9 percent increase in the number of employees in higher education in 2030 compared to 2021. According to the forecast indicator in the mobilization option, the volume of higher education services will reach 518.1 percent in 2030 compared to 2021.

As a result, it was determined that the share of higher education services in GDP will reach 5.6% and the share of total services in GDP will reach 43.9% according to the optimal option, that is, the mobilization forecast indicator.

The fact that the growth of higher education services is faster than the country's GDP is explained by the fact that the price and quality of higher education services are in line with the consumer's desires in increasing the demand for educational services.

### REFERENCES

1. Decree No. PF 5847 of the President of the Republic of Uzbekistan dated October 8, 2019 "On approval of the concept of development of the

higher education system of the Republic of Uzbekistan until 2030"

2. Address of the President of the Republic of Uzbekistan Sh.M. Mirziyoyev to the Oliy Majlis. "Halq so'zi" newspaper. December 29, 2020.
3. National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning. B.-A. Lundvall. – 1992. – P. 2
4. Miles R.E. Network organization: New concepts for the new forms / R.E.Miles, C.C.Snow // California Management Review. –1986. –Vol. 28, № 2. –P. 62-73.
5. Парфенова С.Л. Сетевая модель организации научной деятельности // Наука. Инновации. Образование. –2014. –№ 16. –С. 78 –89.
6. Mamatov, Akhmetjon Atajanovich, Berdiyev, Gayrat Ibragimovich, Mamatov, Mamajan Ahmadjonovich. The level of economic security of kashkadarya region and the methodology of its assessment. ACM International Conference Proceeding SeriesСтраницы 477 – 483 15 December 2022 6th International Conference on Future Networks and Distributed Systems, ICFNDS 2022 Tashkent.
7. Mamatov, Akhmetjon Atajanovich, Mamatov, Mamajan Ahmadjonovich. Econometric forecasts of the impact of high and medium-tech industries on economic growth in Uzbekistan. ACM International Conference Proceeding SeriesСтраницы 468 – 476 15 December 2022 6th

International Conference on Future Networks and Distributed Systems, ICFNDS 2022 Tashkent. .

8. A. Sultanov, Jumaniyazov, K. Halmuratov, example of a state-especially a prosperous state based on a corporate culture of partnership. "Economic and technological news" electronic science magazine. 3<sup>rd</sup> Vol, 2017. May-June.
9. Mirziyoyev GM Shavkat Mirziyoyev, President of the Republic of Uzbekistan, appeal to the Oliy Majlis. T. / / "Halq so'zi" newspaper, 2022 Yale University December 21.
10. Resource from the Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan.
11. Allen L.Webster. Applied Statistics for Business and Economics. USA, BredleyUniversity. 1995. p – 1047.
12. A.A. Mamatov, A.F. Khurramov, M.A. Mamatov, A.D. Anarkulov, and S. Kh. Khasanov. 2021. Integral improvement of economic safety of the regions. In The 5th International Conference on Future Networks & Distributed Systems (ICFNDS 2021), December 15, 16, 2021, Dubai, United Arab Emirates. ACM, New York, NY, USA, 5 pages. <https://doi.org/10.1145/3508072.3508214>.