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Ensuring Long-Term Economic Growth in the World and Econometric Analysis of Economic Growth of the Republic of Uzbekistan in the Context of Extensive, Intensive and Digital Economy

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Annotation: The article describes the scientific and practical aspects of the econometric analysis of economic growth in Uzbekistan in the context of an extensive, intensive and digital economy. It also analyzes the pros and cons of ensuring the quality of economic growth in an extensive, intensive and digital economy.

Keywords: Extensive, intensive factors, digital economy, econometric analysis, comparative analysis.

Introduction

Economic growth is measured by an increase in the volume of production in a society or the volume of products and services created per capita. It is, of course, expressed as an increase in real gross national product or real national income. Measuring economic growth by increasing the absolute volume of GDP or by increasing the real GDP per capita will depend on the purpose for which it is done. Typically, measuring a country's economic growth by increasing its absolute GDP is used to assess its economic potential, while measuring by increasing real GDP per capita is used to compare living standards in a country. The ratio between the growth rate of the social product and the change in the amount of factors of production determines the extensive or intensive types of economic growth.

Extensive economic growth is achieved due to an increase in the amount of factors of production, while maintaining the previous technical basis of production. Let's say that in order to double the production of the product, in addition to the existing enterprise, another similar enterprise will be built in terms of capacity, quantity and quality of installed equipment, number of workers and qualification structure. In extensive development, if it is done in a pure state, the efficiency of production remains unchanged. The fact is that the extensive method of growth has not only a positive side (simple and cheap growth, to a certain extent) but also a negative side:

Since the quantitative growth of production is not accompanied by technical and economic progress, it is characterized by technical hardening;

in most cases the growth of production assumes a costly character.

mproving the living standards of the people, ensuring the sustainable growth of the national economy and increasing the incomes of members of society are important in building a free and prosperous life. At present, the post-industrial stage is typical for the development of the world's leading countries, at which stage the role and place of economic growth factors is changing. The traditional three factors: labor, land, and capital have been joined by the factor of scientific and technological progress, and information and knowledge have become the most important resources. The digital economy is formed directly on this basis, in which man and his potential play a decisive role.

Literature review. Improving the scientific methodology for assessing the impact of qualitative factors of economic growth in the process of transition to a digital economy has led many foreign scientists, including: B. Panshin [1], A. Kuntsman [2], R. Bucht [3], M. Polozhikhina [4], I. Strelkova [5], M.Kalujskiy [6], S.Plugotarenko [7], Baller S., Dutta S., Lanvin B. [8], Cámara N., Tuesta D. [9], G.G.Golovenchik [10], S. V. Chepel [11] et al.

Research methodology. The research used analysis and synthesis, economic-mathematical modeling, comparative analysis, correlation and regression analysis, scientific abstraction, forecasting and other methods.

Analysis and discussion of results (main part). There is no doubt that economic growth will serve to increase the country's overall wealth, expand the state's capacity to address poverty, hunger and other social problems. Similarly, high levels of economic growth are one of the key indicators of economic policy in most countries around the world.

Economic growth is measured by an increase in the volume of production in a society or the volume of goods and services created per capita. It is, of course, expressed as an increase in real gross national product or real national income.

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Econometric modeling of the economy is complex not only in organizational and technical terms, but also in their methodological and theoretical aspects. It requires the creation of a new concept based on international standards, the effective use of which is used in practice, the development of proposals for its critical study and modernization, forecasting. Much attention is paid to the method of correlation and regression analysis at the time of construction of statistical models representing the evaluation between events.

The method of correlation and regression analysis is based on direct zonometric modeling, and its stages are as follows:

identification of economic variables of the model in the formation of the research goal (analysis of the research object, forecasting, imitation of development, management decision, etc.);

analysis of the studied economic phenomenon, the formation of information known before the start of modeling;

the type of economic model is determined, the interrelationships between the variables are expressed mathematically, the initial conditions and constraints of the model are expressed, and, of course, the necessary statistical information is collected during these steps. The model is statistically analyzed, the quality of its parameters is assessed. The validity of the model is checked to determine how well the structured model fits into the real economic event.

However, in the study, we first conduct an econometric analysis of extensive growth using the statistics of the economy of the Republic of Uzbekistan for 2000-2020.

For this purpose, the gross domestic product of the Republic of Uzbekistan - GDP fixed capital investment - AKI, the value of fixed assets in the economy - AFQ, the number of employees in the economy - IBS, the number of enterprises and organizations operating in the economy of Uzbekistan - KS and income from available natural resources - TRD econometric analysis of changes as a result of the influence of factors. In this regard, of course, the correlation coefficients between the influencing factors are determined to ensure that they are selected correctly (Table 1).

Table 1. Coefficient of correlation between the volume of gross domestic product of the Republic of Uzbekistan and the factors influencing it

	YIM	*AKI*	*AFQ*	*IBS*	*KS*	*TRD*
YIM	1					
AKI	0.9742931	1				
AFQ	0.9743633	0.692868	1			
KS	0.81907498	0.697102	0.70072	1		
IBS	0.97493993	0.747873	0.64392	0.755496	1	
TRD	-0.20283965	-0.01753	-0.02283	-0.50675	-0.17204	1

Source: author's calculations

ccording to the values defined in Table 1, the volume of gross domestic product of the Republic of Uzbekistan - investments in fixed assets relative to the GDP factor - AKI (rYIM, AKI = 0.97429), the value of fixed assets in sectors of the economy - AFQ (rYIM, AFQ = 0.974436), in the economy number of items - IBS (rYIM, IBS = 0.81908), number of operating enterprises and organizations - KS (rYIM, KS = 0.97429) with strong density and income from available natural resources - TRD (rYIM, AKI = -0.20284) can be seen to be weakly inversely connected.

Since there is a weak inverse relationship between all factors and the number of operating enterprises and organizations, the regression equation between the factors rx1, x2 <0.8 can be continued using the EViews program. Since the units of measurement of the selected factors are different, the factor indicators are tested on the basis of qualitative criteria, along with the formation of a nonlinear equation by logging the factors (Table 2).

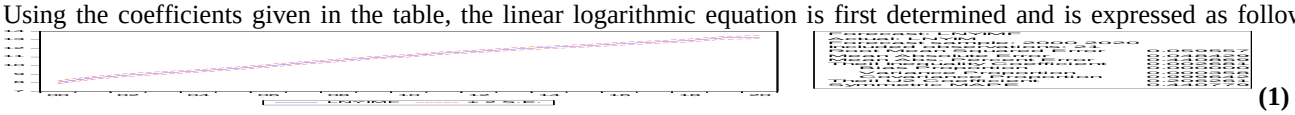
Table 2. Parameters and quality criteria of the model of extensive change in the gross domestic product of the Republic of Uzbekistan

Dependent Variable: LNYIM				
Method: Least Squares				
Date: 10/08/21 Time: 17:35				
Sample: 2000 2020				
Included observations: 21				
Variable	Coefficient	Std. Error	t-Statistic	Prob.

LNAKI	-0.38635	0.267137	-1.44627	0.0049
LNAFQ	0.474321	0.142377	3.331438	0.0046
LNIBS	8.45557	1.249186	6.768864	0.0000
LNKS	1.046709	0.399382	2.620823	0.0193
LNTRD	0.067062	0.057822	1.159788	0.0043
C	-75.44575	12.04991	-6.261104	0.0000
			t=2.13145	
R-squared	0.998570	Mean dependent var		10.99539
Adjusted R-squared	0.998094	S.D. dependent var		1.614075
S.E. of regression	0.070469	Akaike info criterion		-2.232339
Sum squared resid	0.074488	Schwarz criterion		-1.933904
Log likelihood	29.43956	Hannan-Quinn criter.		-2.167571
F-statistic	2095.525	Durbin-Watson stat		1.962872
Prob(F-statistic)	0.000000	F=4.618759		

Source: author's calculations

Using the coefficients given in the table, the linear logarithmic equation is first determined and is expressed as follows:

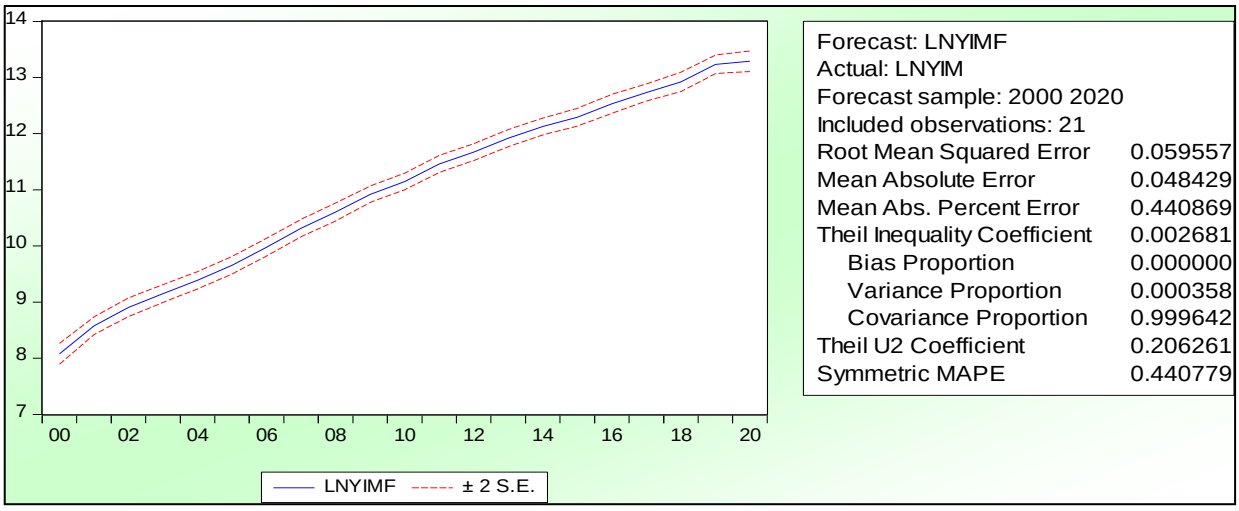


(1)

order to simplify the rules of mathematics and computational processes, as well as to achieve the accuracy of the results, the above regression equation 1 is potentiated and the following equation is formed accordingly:

$$YIM = \frac{AFQ^{0.474} * IBS^{8.456} * KS^{1.05} * TRD^{0.067}}{AKI^{0.38635178} * e^{75.45}} \quad \textbf{(1*)}$$

If we pay attention to the significance of the parameters of the defined 1 * -regression equation according to t-Statistic criteria, investments in fixed assets from tJad = 2.13145 with a = 0.05 and df = 15 - AKI (TAKI = -1.44627) and income from natural resources - TRD (tTRD = 1.159788) factors are insignificant under this> tjad condition, and retrospective quality criteria MAPE (Mean Absolute Percentage Error) and TIC (Tayl inequality coefficient) can be used to verify it. (Figure 1).



Source: Compiled as a result of the author's calculations

Figure 1. Retrospective qualitative criteria of the parameters of the extensive growth model

Based on the data in Figure 1, it can be noted that MAPE = 0.4409, which in turn has a higher forecast accuracy of MAPE = 0.4409 <10%, and the higher the coefficient of TIC = 0.0027 <1, the higher the forecast accuracy. This proves the importance of all the parameters of the 1 * -regression equation.

Now the real significance of the 1 * -regression equation is a = 0.05 and k1 = 15; Since k2 = 5, the Fisher value calculated from FJad = 4,618759 is equal to Fhis = 2095.5. adequacy.

If we give an economic interpretation to the defined 1 * -regression equation, if the value of fixed assets in the sectors of the economy and the amount of income from available natural resources is 1 billion. If we envisage an increase in the volume of GDP, then the volume of GDP will increase by an additional 0.3 billion soums. soums and 1481.4 bln. If the number of jobs in the economy and the number of enterprises and organizations operating in the country is increased by a thousand, the country's GDP will increase by 45.8 billion soums. soums and 1560.2 bln. soums. It should be noted that the

current situation in the country is saturated with investments and the volume of investments in fixed assets is 1 billion. The reduction in the country's GDP by an additional 1.3 billion soums. soums.

In the context of an intensive type of economic growth, the expansion of output is achieved through qualitative improvement of factors of production, modernization of production and skills development of the workforce, as well as better use of existing production potential. The efficiency of each unit of resources involved in the intensive way of production is reflected in the growth of the final product, the increase in product quality. The intensive growth model has a number of new characteristics, features and advantages:

is a rather difficult way of economic growth, in which scientific and technological development plays a decisive role. Accordingly, it implies a high growth of productive forces, machinery, technology, and a high level of education and specialization of personnel;

it is this method of economic growth that allows us to solve the problem of resource constraints. This is one of the main sources of economic growth in this way, saving resources, which is a little cheaper for society than resource growth.

Numerous studies on growth have identified the accumulation of physical and human capital as the most important factors for economic growth, as well as production technology and sound economic policies. Therefore, based on the above characteristics of intensive growth, we carry out an econometric analysis of intensive growth using the statistics of the economy of the Republic of Uzbekistan for 2000-2020.

In this regard, the Republic of Uzbekistan's GDP - labor productivity - GDP, capital productivity - CU, research and development costs - differences in the growth of economic growth between ITX and countries will lead to a significant redistribution of both skilled and unskilled workers. In this case, we make an econometric analysis of the change in the number of university graduates as a result of the influence of OMS factors. Because they tended to move from poor countries or low-wage areas to rich countries or high-wage areas. In order for us to perform the analysis, first of all, of course, the correlation coefficients between them are determined to make sure that the influencing factors are selected correctly (Table 3).

Table 3. Correlation coefficient between the factors of intensive changes in the GDP of the Republic of Uzbekistan

	YIM	*MU*	*KU*	*ITX*	*OM*
YIM	1				
MU	0.999583	1			
KU	0.869922	0.684779	1		
ITX	0.936813	0.733626	0.577564	1	
OMS	-0.508543	-0.403024	-0.55199	-0.66357	1

Source: author's calculations

If we look at the values in the table, the resulting GDP is labor productivity relative to the factor - MU (rYIM, MU = 0.999583), capital productivity - KU (rYIM, KU = 0.869922), the cost of research and development - ITX (rYIM, ITX = 0.936813) factors were correctly correlated at a strong density and the number of university graduates - OMS (rYIM, OMS = -0.508543) was found to be inversely correlated with the average density relative to the outcome factor. If we look at the specific correlation coefficient between the selected factors, there is no multicoloniality under the condition rx1, x2 <0.8, but it can be seen that the number of university graduates is inversely related to all factors.

Based on these results, it is possible to continue to determine the multivariate regression equation of the gross domestic product of the Republic of Uzbekistan in relation to the observed dependence through the program EViews. Before that, of course, all the selected factors must be logarithmized on the basis of e.

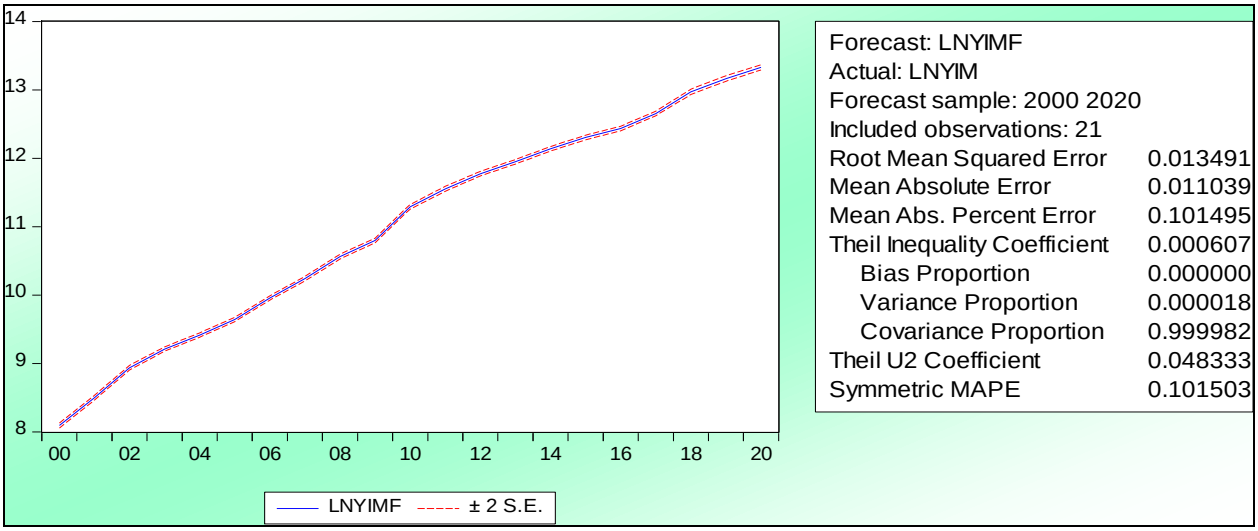
The purpose of this process is the logarithm of the factors of the difference in the units of measurement of the selected factors in relation to the gross domestic product of the Republic of Uzbekistan. After logging the factors, the EViews program determines the coefficients of the gross domestic product of the Republic of Uzbekistan to form a multivariate regression equation and checks it on the basis of quality criteria (Table 4)

Table 4. Parameters and quality criteria of the model of intensive change in the gross domestic product of the Republic of Uzbekistan

Dependent Variable: LNYIM				
Method: Least Squares				
Date: 10/15/21 Time: 07:18				
Sample: 2000 2020				
Included observations: 21				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNMU	1.403124	0.222233	6.313752	0.0000
LNKU	0.043014	0.016840	2.554276	0.0102

LNITX	-0.034120	0.022473	-1.518266	0.0501
LNOMS	-0.061496	0.039718	-1.548316	0.0310
C	1.331662	0.219177	6.075739	0.0000
			2.119905	
R-squared	0.999927	Mean dependent var		10.99539
Adjusted R-squared	0.999908	S.D. dependent var		1.614075
S.E. of regression	0.015455	Akaike info criterion		-5.297468
Sum squared resid	0.003822	Schwarz criterion		-5.048772
Log likelihood	60.62341	Hannan-Quinn criter.		-5.243495
F-statistic	54529.11	Durbin-Watson stat		1.987119
Prob(F-statistic)	0.000000	5.844117		

Source: author's calculations



Source: Compiled as a result of the author's calculations

Figure 2. The result of retrospective quality criteria for the parameters of the model of intensive change in GDP of the Republic of Uzbekistan

If we first focus on the importance of the parameters according to the t-Statistic criteria according to the determined table values, the cost of research and development from tJad = 2.119905 with a = 0.05 and df = 16 - ITX (tITX = -1.518266) and higher education. the number of country graduates - OMS (tITX = -1.548316) factors are insignificant under this> tjad condition and need to be checked with MAPE and TIC to make sure that these parameters are indeed significant or insignificant (Figure 2).

Based on the data in Figure 2, MAPE = 0.1015, which in turn has high forecast accuracy because the MAPE = 0.1015 <10% condition is met, and all the parameters of the equation determined from the coefficient TIC = 0.000607 <1 tend to be zero. = 0.05 and k1 = 16; Given that Fjad = 5.844117 when k2 = 4, the Fisher value calculated from Fhis = 54529.1 is also significant under the condition Fjad <Fhis, and since DW = 1.987, DW = 1.987, the absence of autocorrelation leads to the reliability and adequacy of the equation. Taking into account the importance of all parameters, the following linear equation is formed based on the coefficients given in the table:

$$LnYIM = 1.4031LnMU + 0.04LnKU - 0.03412024LnITX - 0.06LnOMS + 1.332 \quad \textbf{(2)}$$

The resulting linear logarithmic equation 2 is potentiated based on the properties and properties of the logarithmic equations: $YIM = \frac{MU^{1.4031} * KU^{0.04} * e^{1.332}}{ITX^{0.03412024} * OMS^{0.06}}$ **(2*)**

If we give an economic explanation of the 2 * -regression equation identified for this intensive growth, the Republic of Uzbekistan will now increase labor productivity by a thousand soums and capital productivity by 1 million soums, while the gross domestic product will increase by 15.2 thousand soums and 40.3 million soums. soums and expenditures on research 1 bln. 15.5 billion soums. soums. This, in turn, can be explained by the lack of implementation of research developments in the country and, consequently, their low efficiency (it is necessary to develop as much as possible commercialization of existing developments and measures to implement them).

Currently, the growing number of university graduates in the country has a negative impact on the intensive growth of the country's economy, which in turn leads to the need to provide employment for graduates. As a result of the employment of specialists with higher education, the employment of every thousand specialists with higher education will increase the gross domestic product by 450.3 billion soums. soums.

In summary, high rates of higher education growth among the population are beneficial rather than detrimental to economic growth because the economy allows more people to be involved in research. This type of endogenous growth model shows an increase in scale return relative to all inputs used in production. Since there is no competition in the field of secondary goods, inventors can earn income by selling patent rights to intermediate producers. The protection of research in terms of patent rights or subsidies to researchers becomes the most desirable, as research increases efficiency by increasing the knowledge base throughout the economy. This, in turn, stems from the link between the number of graduates and developments in ensuring intensive growth.

Another aspect of economic growth is that the introduction of digital technologies into the economy today is slightly different from what it was at first, and in the context of the digital economy, it is worthwhile to focus on it as well. At present, there is no single standard definition for the academic definition of the concept of digital economy. In the field of foreign research, in 1996, Tapskott, an American IT consulting expert, was the first to advance the concept of the digital economy in his report "Digital Economy: Opportunities and Risks in the Age of Network Intelligence". The main feature of the concept is the digital flow and transmission of information over the network [12].

The term "digital economy" was first introduced in the government report "Emerging Digital Economy" published by the US Department of Commerce in 1998, and the concept of digital economy was gradually recognized by governments and scholars around the world. Since then, relevant research on the digital economy has begun to rise, in the process, the concept of the digital economy has been constantly enriched and deepened, and the category of digital economy research has been constantly improved.

There are two main perspectives for defining the digital economy in a narrow sense. The first is that the digital economy is divided into two parts, ICT services and manufacturing, which are defined as the digital economy, and the second is the retail, platform economy and exchange economy, which are mainly supported by ICT and cannot be separated by official industry codes.

According to Maglio, "the digital economy consists of four parts: Internet infrastructure, e-commerce, digital delivery of goods and services, and retail sales of material goods." According to Meisenberg, the digital economy consists of three main components: e-business infrastructure, e-business and e-commerce [14]. Based on the research, it should be noted that in recent years, many studies have identified relevant products or areas based on the identification of components of the digital economy. Digital platforms have the ability to combine people, organizations and resources to facilitate key interactions between businesses and consumers, as well as increase business management efficiency.

In this regard, the study shows that the factors influencing the change in GDP of the Republic of Uzbekistan - the total number of Internet users in the country - IFJ, the number of mobile subscribers - MAE, the number of enterprises and organizations connected to the Internet - IUK and broadband Internet access. the number of those - PIK was selected and the aim was to conduct research between these selections.

Among the selected factors, using the econometric analysis, the model of change in the GDP of the Republic of Uzbekistan in the digital economy has been identified. To do this, first of all, the degree of general and specific correlation correlation between these factors was calculated (Table 5).

Table 5. The degree of correlation between the factors of the gross domestic product of the Republic of Uzbekistan in the digital economy

	YIM	*IFJ*	*MAE*	*IUK*	*PIK*
YIM	1				
IFJ	0,986981	1			
MAE	0,730989	0,792349	1		
IUK	0,98437	0,684495	0,708376	1	
PIK	0,974688	0,756793	0,621601	0,641791	1

Source: author's calculations

According to the table, the gross domestic product of the Republic of Uzbekistan is the total number of Internet users in the country - IFJ (rYIM, IFJ = 0.986981), the number of subscribers with mobile communication - MAE (rYIM, MAE = 0.730989), enterprises and organizations connected to the Internet number - IUK (rYIM, UIK = 0.730989) and the number of people with broadband Internet access - PIK (rYIM, PIK = 0.730989). Since there is no multicoloniality between the selected factors under the condition rx1, x2 <0.8, it is possible to continue the determination of the regression equation by logarithmizing the factor indices between the factors on the basis of e using the EViews program (Table 5).

Table 6. Parameters of the regression equation of change in GDP of the Republic of Uzbekistan in the digital economy and their quality criteria

Dependent Variable: LNYIM			
Method: Least Squares			
Date: 10/15/21 Time: 07:09			
Sample: 2000 2020			
Included observations: 21			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNIFJ	0.453813	0.106091	4.2775825	0.0005
LNMAE	-0.048803	0.041305	-1.1815228	0.0021
LNIUK	0.848730	0.196946	4.3094461	0.0005
LNPIK	0.111043	0.048379	2.2952952	0.0356
C	-2.088269	1.723236	-1.211830	0.2432
R-squared	0.997015	Mean dependent var		10.99539
Adjusted R-squared	0.996269	S.D. dependent var		1.614075
S.E. of regression	0.098593	Akaike info criterion		-1.591369
Sum squared resid	0.155530	Schwarz criterion		-1.342674
Log likelihood	21.70938	Hannan-Quinn criter.		-1.537396
F-statistic	1336.054	Durbin-Watson stat		1.988438
Prob(F-statistic)	0.000000			

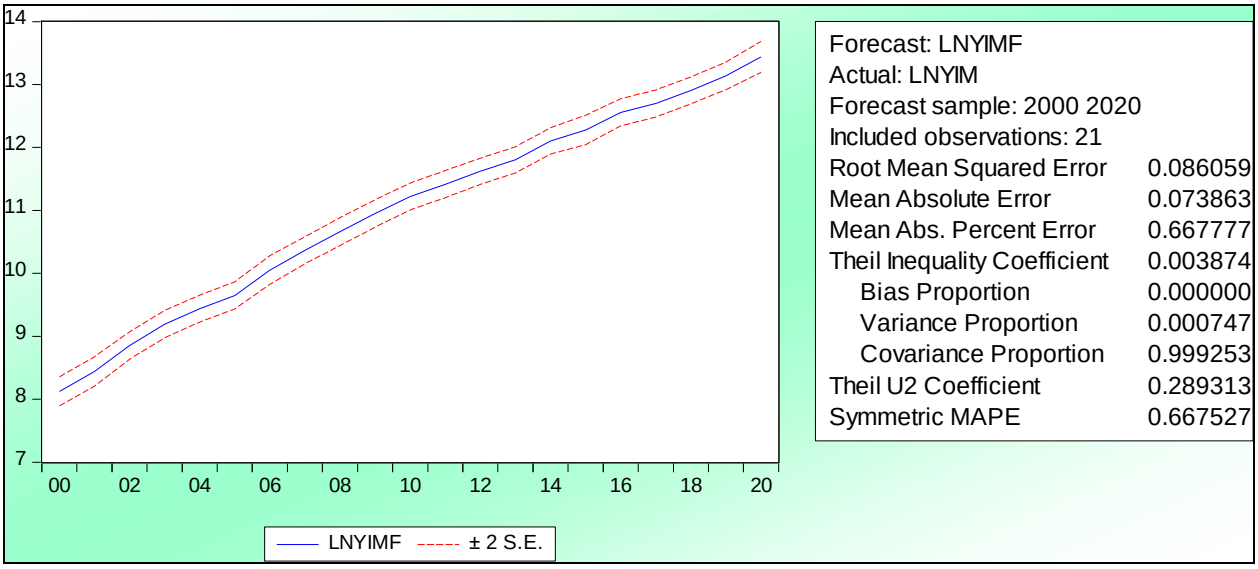
Source: author's calculations

Using the values of the coefficients determined based on the results of the calculations given in the table, the following logarithmic linear equation is first formed**:**

$$LnYIM = 0.45LnIFJ - 0.0488028LnMAE + 0.85LnIUK + 0.11LnPIK - 2.09 \quad \textbf{(3)}$$

The resulting regression equation 3 is divided by potentiation to establish the accuracy of the resulting values and their conformity to the actual process with the following result: $YIM = \frac{IFJ^{0.45} * IUK^{0.85} * PIK^{0.11}}{MAE^{0.0488028} * e^{2.09}}$ **(3*)**

If we pay attention to the significance of the parameters of the 3 * -regression equation on the parameters t-Statistic, the number of subscribers who have only mobile communication from tJad = 2.119905 with a = 0.05 and df = 16 - MAE (tMAE = -1.181523 <tJad = 2.119905) is insignificant and we check with MAPE and TIC to make sure that this parameter is significant or insignificant (Figure 3).



Source: Compiled as a result of the author's calculations

Figure 3. The result of retrospective quality criteria of 3 * -regression parameters

Based on the data in Figure 3, it can be noted that MAPE = 0.668, which is high for the forecast accuracy because the MAPE = 0.668 <10% and TIC = 0.0039 <1 meet the criteria, respectively, and a = 0.05 and k1 = 16; Given that Fjad = 5.844117 when k2 = 4, the Fisher value is calculated from Fhis = 1336.1. We will now explain this defined 3 * -regression equation economically.

According to him, if today the number of Internet users in the Republic of Uzbekistan is increased by a thousand, the country's GDP will reach 10.5 billion. soums and an increase in the number of mobile subscribers by 1160.4 billion soums. soums. This situation can be explained by the reduction of Internet speed as a result of improper use of the Internet by subscribers with mobile communications.

In addition, if we increase the number of enterprises and organizations connected to the Internet by one unit and the number of people with access to broadband Internet by a thousand, then the gross domestic product of the Republic of Uzbekistan will reach 3.93 billion soums. soums and 11.8 bln. soums.

In short, the Internet has launched the third wave of capitalism, which is transforming many aspects of the world market - from consumer behavior to new business models. This shift in developing and emerging economies is supported by mobility, cloud computing, business intelligence and social media.

Tectonic shifts in the world economy, along with technological leaps, are irreversibly changing the world market. The global recession of 2008-09 accelerated market trends driven by the understanding of consumer spending, industry change, globalization of markets, business uncertainty and the emergence of risk, promoted by the Internet and other forces. A review of this will break the usual thinking about key issues: where to find growth, how to meet customer needs, and how to enter the market.

Although sometimes thought of separately, economic growth and technology are closely intertwined, research shows that industrial expansion in emerging markets, wealth growth, and population growth have increased demand for technology. In a developed economy, however, the investor's high return rates increase the need to save costs and expand innovation. Regardless of their location, firms that want to grow need to deal with the thriving parts of the economy - the digital market and the developing world. This creates a good era for the digital market to thrive in a growing and thriving economy.

In today's interdependent environment, this quality circle can lead to rapid market change, unlike in the past. Historically, most firms in developed economies have been modernized as part of an internal strategy, first growing within their own boundaries and then replicating their business elsewhere. However, today's emerging economies are doing so in such a way that technology has made it much easier to access global capital, talent and other resources, allowing them to plan the global market immediately.

Although the world economy has seen significant growth in the economies of developed and developing countries by the year 2000, the economies of a number of developing countries have faced domestic and international crises. Nevertheless, with the future in mind, there has been an unusual shift in the economic outcomes of many developing countries. They have reaped great benefits by making proper use of the extremely favorable conditions provided by the long-term good performance of the world economy, the increase in the relative price of goods, and the attraction of capital inflows.

Reducing the impact of the pandemic, which led to the global crisis in 2020, is expected to significantly increase the average wage and income, reduce unemployment, inequality and poverty as a result of the recent shift to economic growth. However, despite these favorable economic conditions, our republic is characterized by a high level of socio-economic exclusion and inequality compared to other developed and developing countries. In this regard, will our country achieve structural and qualitative changes in the labor market in the long run, based on a good trend in the long run? Has it significantly reduced the gap between the Republic of Uzbekistan and developed countries? To discuss these issues, the study presents new elements to better understand the relationship between economic growth in the Republic of Uzbekistan and the factors affecting it.

To do this, we will study the qualitative and quantitative aspects of the dynamics of economic growth in our country and neighboring countries, as well as developed and developing countries. Through this, we discuss the contribution of changes in the structure of economic activity between countries to growth dynamics, as well as differences in efficiency between these countries. Studies show that economic growth in Uzbekistan is associated with more labor-intensive activities, more resource use, and a significant improvement in high productivity in developing and developed countries. led to a high level of their labor productivity.

If we look at the experience of the world economy, we will see that the last quarter of the twentieth century was marked by the intensification of liberalization of international trade, investment and financial markets. This contributed to progressive international economic integration and gave rise to new technologies, as well as forms of organization of production and political hegemony. Developed countries have experienced various difficulties in the interval up to this period.

Of course, such unexpected difficulties and crises in the economy force us to develop measures against it. In particular, the emergence of a period of strong inflation has frightened domestic and foreign investment and destroyed opportunities for economic growth. As a countermeasure, inflation management has become almost obsessive, and the sensitivity of international financial markets has prompted their governments to adopt limited macroeconomic policies that have a negative impact on the economy and employment.

Most countries have shifted to market-based approaches as a way to control hyperinflation, attract foreign direct investment, and stimulate economic development. However, this in turn has led to the ineffective or incorrect implementation and implementation of economic reforms, which has led to a decline in economic performance and additional challenges instead of improving the socio-economic conditions of these countries.

This, in turn, means that developing countries need to have experience and develop measures to counteract any unforeseen effects that may occur over time. Developed countries in the allocation of budget funds prefer to invest in human resources rather than fixed assets, while achieving a high level of economic development and quality of life. In this regard, the study of the impact of the components of human capital on the economic growth of the country is of particular interest. In conclusion, in this study, we carry out a correlation-regression analysis of the impact of qualitative factors of economic growth of the Republic of Uzbekistan on the economies of other developed and developing countries.

To do this, using the World Statistics data of all selected countries for 1999-2019, GDP per capita (in US dollars) - YiYa capital investment (in US dollars) - KQ, household consumption (in US dollars) - UXI , carbon dioxide emissions

(thousand tons) - KACh, country population (million) - MAS and life expectancy in the country (years) - we will try to estimate by determining the impact of OUK factors. First, we conduct an econometric analysis of changes in the economic quality of the Japanese state based on the knowledge economy (Table 7).

Table 7. Correlation coefficient of selected factors on changes in the economic quality of the Japanese state

	Y_{iYa}	KQ	UXI	KACh	MAS	O'UK
Y_{iYa}	1					
KQ	0,801308	1				
UXI	0,984743	0,7205062	1			
KACh	-0,01486	0,0187372	0,060042	1		
MAS	0,167644	-0,1255893	0,273506	0,463261	1	
O'UK	0,348401	0,007446	0,360851	-0,33696	-0,24692	1

If we look at the values in the table, the GDP per capita of Japan is very strongly linked to capital investment - KQ (rYiYa, KQ = 0.8013) and household consumption - UXI (rYiYa, UXI = 0.9847). The development of relatively new scientific and technological advances is not in vain, ie how much investment is made and household consumption is important not only for the livelihood of the population, but also for active participation in production, which ultimately contributes to GDP growth. indicates the high impact.

The population of the next selected country - MAS (rYiYa, MAS = 0.1676) and life expectancy - OUK (rYiYa, OUK = 0.3484) were found to be weakly and correctly correlated with the GDP per capita. This, in turn, means that despite the current decline in the population in Japan (the average number of household members fell to 2.33 in 2015), the current adequacy (population of working age (15-64 years)) is 74.49 million, which is less than the total population. 59.3 per cent) however, the next factor to note is that given that life expectancy in Japan will be 87.5 years for women and 81.4 years for men in 2019, it poses a problem for future aging.

The final carbon dioxide emissions - KACh (rYiYa, KACh = -0.0149), the factor of which is inversely and weakly related to the factor of GDP per capita (the Japanese government in the relocation of domestic manufacturing bases abroad, reducing production costs, in the production of consumer goods and in avoiding exchange rate fluctuations), and since there is no multicoloniality between the selected factors under the condition rx1, x2 <0.8, it is possible to continue to determine the regression equation between EViews using the natural logarithm of all factors.

Table 8. Coefficients of selected factors and examination criteria for changes in the economic quality of the Japanese state

Dependent Variable: LnY_{iYa}				
Method: Least Squares				
Date: 08/07/21 Time: 08:58				
Sample: 1999 2019				
Included observations: 21				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LnKQ	0.261409	0.069897	3.739888	0.0020
LnUXI	0.716132	0.052467	13.64928	0.0000
LnKACh	-0.147965	0.065632	-2.254450	0.0395
LnMAS	-0.067763	0.976103	-0.069422	0.0469
LnO'UK	0.192328	0.302511	0.635771	0.0345
C	4.634037	5.567890	0.832279	0.0183
R-squared	0.992468	Mean dependent var		10.55755
Adjusted R-squared	0.989957	S.D. dependent var		0.105948
S.E. of regression	0.010617	Akaike info criterion		-6.017703
Sum squared resid	0.001691	Schwarz criterion		-5.719268
Log likelihood	69.18588	Hannan-Quinn criter.		-5.952935
F-statistic	395.3065	Durbin-Watson stat		1.849439
Prob(F-statistic)	0.000000			

Based on the values of the coefficients given in the table, the following equation is formed:

LnY_{iYa}=0.26LnKQ+0.716LnUXI-0.15-0.0677626LnMAS+0.19LnUK+4.63 (4)

Considering the significance of the parameters of the defined regression equation 4.1.1 according to the t-Statistic criteria, the carbon dioxide emissions selected for the model from tJad = 2.13145 with a = 0.05 and df = 15 - KACh (tKACh = -2.255), the population of the country - MAS (tMAS = -0.081) and life expectancy in the country - OUK (tOUK = 0.6358)

are insignificant, and whether these parameters are really significant or insignificant MAPE <10 and TIC <1 retrospective quality criteria verification is required (Figure 4).

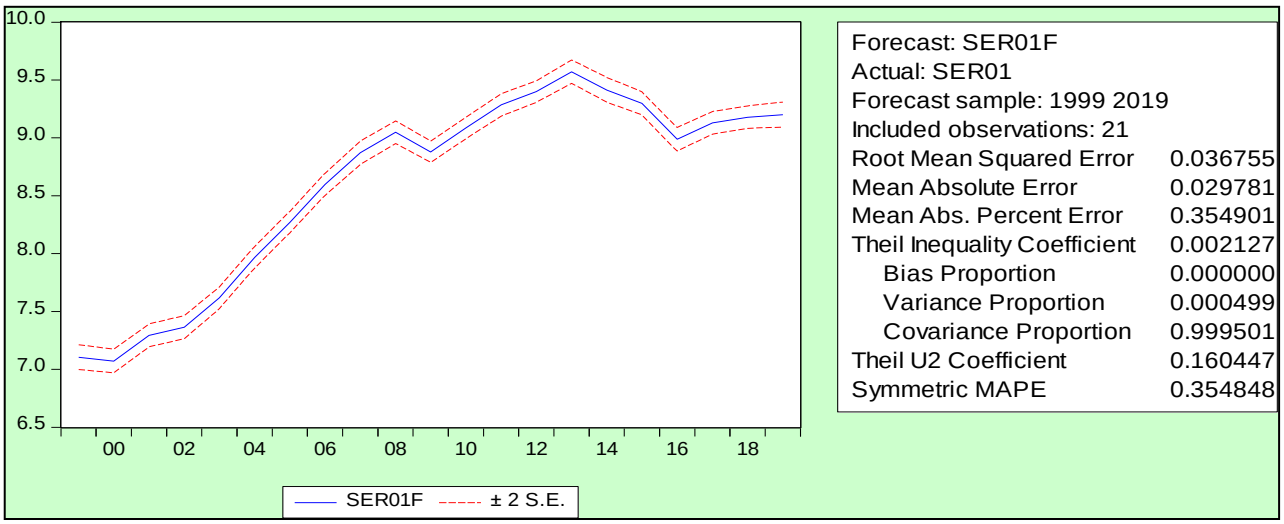
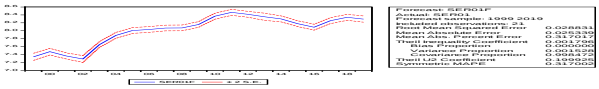


Figure 4. Result of retrospective quality criteria of regression parameters 4

Based on the data presented in Figure 4, it can be noted that MAPE = 0.355 and TIC = 0.0021 <1, which in turn is due to the high accuracy of the forecast, the importance of all parameters of the regression equation 4 In order to simplify the rules of mathematics and computational processes and to achieve the accuracy of the results, the regression equation 4 generated above is potentiated and the following equation is formed accordingly:

 (4*)

The real significance of the generated 4* -regression equation is a = 0.05 and k1 = 15; Given that FJad = 4.618759 when k2 = 5, the value of Fisher is equal to Fhis = 395.31. FJad <Fhis and adequacy.

An economic explanation of the identified 4* -regression equation was found to be an additional $ 8.5 and $ 10.2 per capita GDP if the volume of capital investment and household consumption in the Japanese economy was increased by $ 1 billion, respectively. If carbon dioxide emissions are now reduced by 1 ton, then Japan's GDP per capita will increase by an additional $ 0.56 and the country's population by one million, while the country's GDP per capita will increase by an additional $ 21.8. It should be noted that if the average life expectancy in the country is increased by one year, the GDP per capita in Japan will increase by an additional $ 91.13.

Switzerland, which now has the highest GDP per capita and living standards among the OECD countries, has a per capita GDP - capital investment affecting GDP (in billions of dollars) - KQ, household consumption (in billions of dollars) - We will consider the econometric analysis of UXI, carbon dioxide emissions (thousand tons) - KACh, country population (million) - MAS and life expectancy in the country (years) - OUK factors. When conducting an econometric analysis of economic quality changes in the Swiss state, it is first necessary to determine the correlation coefficient between the selected factors (Table 8).

Table 8. Correlation coefficients of selected factors on changes in the economic quality of the Swiss state

	Y_{iSh}	KQ	UXI	KACh	MAS	O'UK
Y_{iSh}	1					
KQ	0,917381	1				
UXI	0,992619	0,786782	1			
KACh	-0,03148	-0,19508	-0,00907	1		
MAS	0,778366	0,671064	0,760205	0,134111	1	
O'UK	0,427373	0,232664	0,437502	0,340689	0,834139	1

According to the table, the factors of GDP per capita of the Swiss state - capital investment in relation to GDP - KQ (rYiSh, KQ = 0.9174) and household consumption - UXI (rYiSh, UXI = 0.9174) are strongly correlated.

The GDP per capita of the Swiss country is the population of the selected country - MAS (rYiSh, MAS = 0.7784) with a higher than average density, and the average life expectancy in the country - OUK (rYiSh, OUK = 0.7784). found to be bound at moderate densities. Switzerland benefits from high employment and productivity and avoids growing inequality based on the experiences observed in many advanced economies. However, the employment rate of older workers will decline and over time, pension replacement rates may decline, increasing income inequality. The burden of increasing costs associated with aging falls mainly on cantons and municipalities.

In this regard, Switzerland plans to set the retirement age at 65, then gradually raise it to 67, and then link life expectancy. Making wage setting more flexible, easing the age-related progression of pension contributions and combating age discrimination will help to see longevity. Based on the results of the study, it should be noted that in order to further ease the pension pressure, it is necessary to reduce the rate of retirement of accumulated assets, as the current level is too redistributed from young workers to retirees.

The regression equation can be determined by the correlation between the factors observed in the absence of multicoloniality under the condition rx1, x2 <0.8, which is inversely related to the country's carbon dioxide emissions per capita (rYiSh, KACh = -0.032). To do this, we continue the process by logging all the factors on the basis of e (Table 9).

Table 9. Coefficients and verification criteria of selected factors on changes in the economic quality of the Swiss state

Method: Least Squares				
Date: 08/07/21 Time: 09:21				
Sample: 1999 2019				
Included observations: 21				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
lnKQ	0.193598	0.101928	1.899351	0.0369
LnUXI	0.761483	0.049077	15.51622	0.0000
lnKACh	0.027071	0.082750	0.327139	0.0481
LnMAS	1.401000	0.716082	1.956480	0.0493
lnO'UK	-0.286334	0.201195	-1.359957	0.0093
C	8.324375	0.807973	10.30278	0.0000
R-squared	0.993908	Mean dependent var		8.017545
Adjusted R-squared	0.991878	S.D. dependent var		0.378525
S.E. of regression	0.034114	Akaike info criterion		-3.683268
Sum squared resid	0.017456	Schwarz criterion		-3.384833
Log likelihood	44.67431	Hannan-Quinn criter.		-3.618500
F-statistic	489.4780	Durbin-Watson stat		1.921620
Prob(F-statistic)	0.000000			

Based on the results of the calculations, we obtain the following linear logarithmic regression equation:

$$Y_{iSh} = 0.19LnKQ + 0.76LnUXI + 0.03Ln + 1.4LnMAS - 0.286334LnO'UK + 8.32 \quad \textbf{(5)}$$

According to the results of Table 4.1.4, if we check the parameters of the regression equation 5 according to the t-Statistic criteria, only a Swiss state from the factors selected for the model from tJad = 2.13145 with a = 0.05 and df = 15. household consumption - UXI (tUXI = 15.516) factor is important, we will try to determine the result of checking whether all other parameters are really significant or insignificant with the criteria MAPE <10 and TIC <1 (Figure 5).

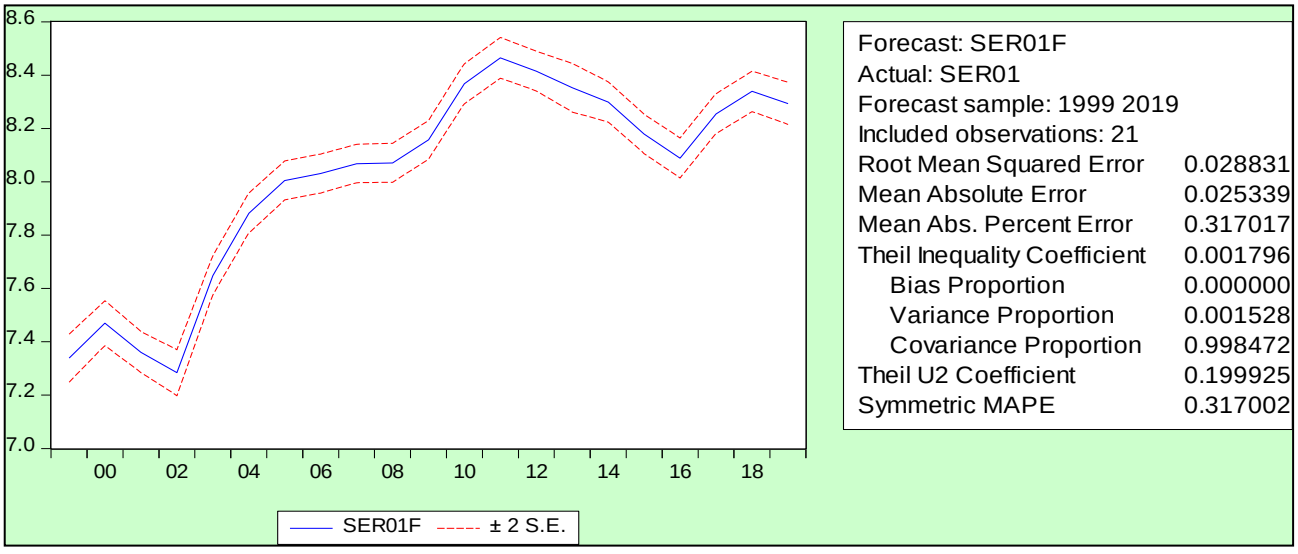


Figure 5. Results of examination of regression parameters 5 with retrospective quality criteria

According to the data found in Figure 5, MAPE = 0.317 <10 and TIC = 0.002 <1, which in turn is due to the high accuracy of the forecast and the importance of all parameters of the regression equation 5. The following regression equation is formed based on the data given in Table 9 above to simplify the rules of mathematics and calculation processes and to achieve the accuracy of the results:

$$Y_{iYa} = \frac{KQ^{0,19} * UXI^{0,76} * KACh^{0,03} * MAS^{1,4} * e^{8,32}}{O,UK^{0,286334}} \quad (5^*)$$

The real significance of the resulting 5* -regression equation is a = 0.05 and k1 = 15; Given that FJad = 4.618759 when k2 = 5, the Fisher value is calculated from Fhis = 489.5.

Now, if we economically interpret the multivariate 5* -regression equation determined by the economic quality of the Swiss state, we can see that if the capital investment in the country's economy and household consumption is 1 billion. In Switzerland, the GDP per capita will increase by 67.0 and 103.03 US dollars, respectively. In addition, it should be noted that given the great attention paid to the environment in the country and the low level of environmental damage in production, even an increase in carbon dioxide emissions into the environment leads to an increase in GDP per capita.

In particular, if the volume of carbon dioxide emissions is increased by 1 ton, the gross domestic product could increase by an additional $ 0.12. If the population of a country is 1 million. The per capita GDP in Switzerland will increase by an additional $ 48.9, and if the average life expectancy in the country is extended by one year, the GDP per capita may decrease by an additional $ 18.8. We will now carry out an econometric analysis of the Republic of Uzbekistan and the neighboring Republic of Kazakhstan, which share the same religious traditions and beliefs, using the above factors (Table 10).

Table 10. Models of the impact of human capital on the changes in the GDP of the Republic of Uzbekistan and the Republic of Kazakhstan

№	Countries	Model expression	Test results with criteria				
			R^2	t-statiatica $t_{жад}$=2,13	MAPE<10, TIC<1	F	DW
1	Uzbekistan	$Y = \frac{X1^{0,30} * X2^{0,693} * X3^{0,037} * X5^{2,54} * e^{0,061}}{X4^{2,06}}$	0,999	t_{X3}=0,37 t_{X4}=-4,99 t_{X5}=1,05	MAPE=0,176; TIC=0,001	6394,4	1,8
2	Kazakhstan	$Y = \frac{X1^{0,24} * X2^{0,83} * X3^{0,162} * X4^{0,19} * e^{17,7}}{X5^{3,67}}$	0,997	t_{X3}=0,905 t_{X4}=0,143 t_{X5}=-1,58	MAPE=0,355; TIC=0,002	1501,4	1.82

The data obtained confirm our assumptions that the development of both material resources and human capital will affect the quality of economic growth. The above results show that per capita GDP has a positive impact on capital investment, household consumption and population, but the higher the level of carbon dioxide emissions, the negative impact on economic growth, resulting in lower life expectancy, health and well-being. the quality of economic growth declines, leading to a deterioration.

Thus, taking into account all of the above, we can conclude that the competitive advantages of the economy today and the possibility of modernization are largely determined by the accumulated and realized human capital. In Uzbekistan, more attention should have been paid to achieving high economic growth compared to developed countries with human capital.

$$YaIM = \frac{AFQ^{0.474} * IBS^{8.456} * KS^{1.05} * TRD^{0.067}}{AKI^{0.38635173} * e^{75.45}} \quad (6)$$

Fixed capital investments - $\mathrm{AKI} = -20487{,}8 + 10984{,}9 * t;$

The value of fixed assets in sectors of the economy - $\mathrm{AFQ} = -26665{,}4 + 47650{,}3 * t;$

The number of jobs in the economy - $IBS = 8167 + 241{,}4 * t;$

Number of enterprises and organizations - $KS = 122{,}4 + 16{,}8 * t;$

Income from natural resources, relative to GDP - $TBD = 21{,}6 + 0{,}5 * t.$

Using the multifactorial regression equation 4.2.1 * -regression of the determined GDP of the Republic of Uzbekistan and the system of time-dependent equations of the factors involved in it, the forecast indicators for t = 22 are determined (Table 11).

Table 11. Multifactor forecast of GDP growth in the Republic of Uzbekistan

Years	GDP, billion soums	Fixed capital investments, bln. sum	Value of fixed assets (billion soums)	Number of jobs in the economy, thousand	Number of enterprises and organizations, thousand	Income from natural resources, (in relation to GDP) in%
2021	731045,2	221180	1021641,2	13477,8	492	32,6
2022	883371,3	232164,9	1069291,5	13719,2	508,8	33,1
2023	1063330	243149,8	1116941,8	13960,6	525,6	33,6
2024	1275233	254134,7	1164592,1	14202	542,4	34,1
2025	1523965	265119,6	1212242,4	14443,4	559,2	34,6
2026	1815042	276104,5	1259892,7	14684,8	576	35,1

According to the results of the forecast by the extensive method, the investments in fixed assets of the Republic of Uzbekistan in 2021 compared to 2020 will increase by 5.2% (221180.0 billion soums) in the economy by 4.9% (1021641.2 billion soums) in the economy. The number of employees increased by 1.9% (13477.8 thousand people), the number of enterprises and organizations increased by 3.5% (492 thousand units) and income from natural resources increased by 32.6% of GDP. soums and amounted to 731045.2 bln. soums.

By 2026, the gross domestic product of the Republic of Uzbekistan will increase 2.5 times compared to 2021 and will amount to 1815042.0 billion soums. Of course, the value of fixed assets in the economy amounted to 1259892.7 billion soums. soums, income from natural resources is expected to increase by 35.1% of GDP to 14684.8 thousand people and 576.0 thousand people, respectively, and the number of enterprises and organizations in the economy.

If we pay attention to the future prospects for the intensive growth of the economy of the Republic of Uzbekistan, then the multi-factor 7 -regression equation for the intensive growth of the economy of the Republic of Uzbekistan identified above:

$$YaIM = \frac{MU^{1.4031} * KU^{0.04} * e^{1.332}}{ITX^{0.03412024} * OMS^{0.06}} \quad (7)$$

and a system of time-dependent equations (t = 22) of the indicators selected as factors influencing it:

labor productivity - $MU = -297{,}6 + 2181{,}9 * t;$

capital productivity - $KU = 381{,}3 + 11{,}3 * t;$

Expenditures on scientific research and development - $ITX = -119{,}2 + 68{,}8 * t;$

number of graduates of higher education institutions - $OMS = 80{,}1 + 0{,}18 * t;$ the multifactor forecast of intensive economic growth of the Republic of Uzbekistan is determined using (Table 12).

Table 12. Multifactor forecast of intensive economic growth of the Republic of Uzbekistan

Years	GDP, billion soums	Labor productivity, thousand soums	Capital productivity, mln. sum	Expenditures on scientific research and development, bln. sum	Higher education, thousand people
2021	634882,6	47704,2	629,9	1394,4	84,1
2022	667392,1	49886,1	641,2	1463,2	84,2
2023	700080,4	52068,0	652,5	1532	84,4
2024	732941,4	54249,9	663,8	1600,8	84,6
2025	765969,2	56431,8	675,1	1669,6	84,8
2026	799158,4	58613,7	686,4	1738,4	85,0

Source: Author's calculations

According to the forecast, the volume of gross domestic product in 2021 will increase by 6.0% compared to 2020 and reach 634882.6 billion soums. According to the current situation, the productivity of labor (47,704.2 thousand soums) and capital (629.9 million soums) will increase by 4.8% and 1.8%, respectively, and the cost of scientific research will increase by 5.2%. increased by 1394.4 billion. soums.

In 2026, the number of university graduates will increase by 1.1% compared to 2021, capital and labor productivity will increase by 9.0% and 22.9%, respectively, the country's GDP will increase by 29.3% to 826320.8 billion soums. is expected to be equal to UZS.

It should be noted that in the analysis of the intensive growth process in the research work, the selection of graduates of higher education institutions and capital productivity indicators shows that if people spend more time studying, they become more knowledgeable and more skilled. This increases the per capita human capital available in the economy, replenishes it with physical capital, and increases the working capacity and efficiency of workers. Such growth in production is a major source of economic growth. Capital productivity, on the other hand, is higher in many developing countries than in many emerging economies, and government policies that increase savings rates only affect the growth rate of production.

Equation 8 -regression defined as a model of economic growth in the digital economy of the Republic of Uzbekistan:

$$YaIM = \frac{IFJ^{0.45} * IUK^{0.85} * PIK^{0.11}}{MAE^{0.0488028} * e^{2.09}} \quad (8)$$

Internet users in the country - $IFJ = 8167 + 241{,}4 * t;$

the number of subscribers who have a mobile connection - $MAE = 8167 + 241{,}4 * t;$

number of enterprises and organizations connected to the Internet - $IUK = 8167 + 241{,}4 * t;$

and the number of people with broadband Internet access - $PIK = 8167 + 241{,}4 * t;$

Using the system of equations, the multifactor forecast of economic growth of the Republic of Uzbekistan in the digital economy is determined (Table 13)

Table 13. Multifactor forecast of economic growth of the Republic of Uzbekistan in the digital economy

Years	GDP, billion soums	The total population of Internet users, thousand people	Number of subscribers with mobile communication, mln. person	Number of enterprises and organizations connected to the Internet, in units	Number of people with broadband Internet access, thousand people
2020	602551,4	26264,8	25,1	132580	5700,8
2021	642502,0	27541,5	26,5	138972	5991,2
2022	683124,1	28818,2	27,9	145363	6281,6
2023	724398,6	30094,9	29,3	151755	6572
2024	766307,8	31371,6	30,7	158147	6862,4
2025	808834,9	32648,3	32,1	164539	7152,8
2026	851964,6	33925	33,5	170930	7443,2

Source: Author's calculations

According to the multi-factor forecast of economic growth of the Republic of Uzbekistan in the digital economy, in 2026 compared to 2021, the gross domestic product will increase by 32.6% to 851964.6 billion soums. The number of Internet users increased by 23.2%, the number of mobile subscribers by 26.4%, the number of enterprises and organizations connected to the Internet by 23.0% and the number of broadband Internet access by 24.2%. percent and is expected to reach 7443.2 thousand people.

Individual use of ICT enhances growth in several ways. First, it serves as a platform for people to learn and disseminate knowledge, which allows them to work more efficiently. Personal use of the network will increase the value of such products for others and cause external influences, while many people engage in digital technologies such as mobile phones or social networks. The increase in individual use of advanced technologies will increase the demand for ICT-enabled goods and services, which will lead to the growth of the telecommunications sector. Finally, individual use facilitates digital communication, which raises awareness of the availability of goods and services in the market, leading to increased demand for goods and services through marketing.

According to the data shown in Figure 6, it can be seen that at the highest level, i.e., in 2026, extensive growth increased by an average of 2.5 times compared to 2020. However, it should be noted that according to the concept of socio-economic development of the Republic of Uzbekistan until 2030, increase the share of intensive factors in economic growth, including increasing the share of alternative and renewable energy in the energy balance to 25%, doubling energy efficiency and 1% labor efficiency. , Given the 8-fold increase, it is advisable to focus on intensive growth rather than extensive in the country.

If we look at the data presented in the picture, the intensive growth is expected to reach 826320.8 billion in 2021-2026 with an average growth of 17.5%. soums. The rate of economic growth under the influence of digital technologies averaged 20.3% and amounted to 851964.6 billion. soums.

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