Forecasting Indicators of Business Development in Uzbekistan

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ABSTRACT: *The article is devoted to econometric modelling and forecasting of business development using correlation and regression analysis. Also, a model for the development of GDP business is given, taking into account the indicators of the share of business in the number of employees in the volume of agricultural production, exports of the Republic of Uzbekistan and the forecast value of the share of business in GDP by 2017-2021.*

Artikel ini dikhususkan untuk pemodelan ekonometrik dan peramalan perkembangan bisnis menggunakan analisis korelasi dan regresi. Juga, model untuk pengembangan bisnis PDB diberikan, dengan mempertimbangkan indikator bagian bisnis dalam jumlah karyawan dalam volume produksi pertanian, ekspor Republik Uzbekistan dan nilai perkiraan bagian bisnis dalam PDB pada 2017-2021.

Keywords: *Business, Dependent Factor, Independent Factor, Regression Equation, Significance Estimation, Multiple Linear Regression Model, Fisher's Test, Prediction.*

I. INTRODUCTION

Business is an integral part of the economy in most developed countries, it performs the most important socio-economic functions of providing employment and creating a competitive environment and contributes to improving the welfare of the population (North Douglass, 2004).

Business plays an important role in shaping and developing the economy of Uzbekistan (Koo, 2009). Since gaining independence, the government, at the initiative of the first President of the Republic of Uzbekistan, I.A. Karimov, has carried out huge economic changes (Decree of the President Sh. Mirziyoyev, 2017). Our priority in the economy is

the development of private property and private entrepreneurship through the implementation of fundamental structural changes, as well as the consistent continuation of the processes of modernization and diversification (Knight F., 1942);(Pamela, 2015). "Business," according to the President, "is already becoming not only the main link employing the population and a source of income, but also the most important factor in the stability of the economy, the guarantor and support of the social and political stability of our society, and an active driving force for the country's progress along the path of progress". (Massey, 2010);(Karimov, 2012);(Luger Michael I. & Koo, 2009).

Regulatory legal acts in specific areas are updated annually in the country. Confirming certain conditions and opportunities of Uzbekistan, experts in the field of economics are constantly conducting scientific and practical research on the modernization and development of the infrastructure of the country's economy (Silverman, 2014). Business in a market economy helps to achieve specific goals, and it is also of great importance in overcoming poverty and accumulating human capital. The flexibility inherent in small businesses and high adaptability to market conditions and changes contributes to the stabilization of macroeconomic processes in the country (Country, 2016).

Based on the foregoing, studying the development of a business and predicting its future is a vital necessity. One of the ways to solve this problem is econometric modelling of the business development process in a specific place and time (World Bank, 2000).

Theoretical scientific problems of creating and developing a business were studied by such foreign scientists as J. Schumpeter, R. Cantilon, M. Weber, W. Sombard, J. B. Say, R. Khizrich, M. Peters, A. Hosking, A. Busygin, Yu. Osipov, A.Sharipov, M.Balashevich. S. Khachatryan, N. Koroleva, N. Egorova, E. Main, B. Breev, O. Voronevskaya, E. Helfert, P. Belykh wrote about the socio-economic process of modelling, the basis and method of business development (EBRD Legal Indicators Survey, 2019).

Scientific and practical foundations and problems of business development research in the Republic of Uzbekistan are presented in the works of S. Gulomov, Y. Abdullaev, A. Vakhobov, M. Kosimova, T. Dustzhanov, S. Salaev, K. Muftaidinov and others. Methods and models of statistical analysis of the structure and dynamics of economic indicators in a market economy were studied by T. Shodiev, B. Khodiev, Sh. Kholmuminov, N. Makhmudov, B. Begalov, B. Berkinov, K. Safaeva, B. Ataniyazov, B. Salimov, Yu. Mukhamedov, A. Aimbetov, etc (Porter & Stern, 2013).

Econometric modelling of business trends and development problems are presented in the works of B.Yu. Khodiev, B.B. Berkinov, S.K. Salaev, A.B. Yugay, M.A. Repina (Process approach to management. Business process modelling), V.G. Eliferova (Business processes. Regulation and management), Andersen Berna (Business processes. Improvement tools), A.V. Scheera (Business process modelling), G.Kalyanova (Methods and tools for enterprise architecture modelling), they all analyzed and gave scientific and practical recommendations on these issues (Repina & Eliferov, 2004);(Eliferova, 2004);(Bern, 2005);(Scheera, 2000);(Kalyanov, 2006).

II. METHOD

In the country, due to the lack of direct information, the study of business dynamics presents great difficulties. In this regard, we tried to model the development of business in Uzbekistan using its indirect data, i.e. the share of business in the production activities of industries and the country as a whole (in percent). The volumes of manufactured products and services rendered by sectors of the economy for a certain period in market prices constitute the volume of GDP. Hence, the situation arises that the dynamics of the volume of GDP are directly affected by the dynamics of the volume of manufactured goods and services rendered in the country as a whole.

From a methodological and practical point of view, when studying the dynamics of the development of the share of business in GDP, taking into account all its influencing factors presents certain difficulties. In this regard, we limited ourselves to factors that, in our opinion, have a significant impact on the dynamics of the share of business in GDP, such as the share of business in the number of people employed in the economy, the volume of agricultural production, exports of goods and services, as well as the shared business in the volume of other sectors of the economy, although in terms of methodology it was possible to take other factors.

III. RESULT AND DISCUSSION

The objectives of the study are to identify patterns in the dynamics of the development of the share of business in the country's GDP over a certain period, taking into account the dynamics of the development of the share of business in the above sectors of the economy.

This problem can be solved by econometric modelling using correlation-regression analysis. When studying the main indicators of business development, the share of business in GDP acts as a dependent factor, and the share of business in the number of people employed in the economy, in the volume of agricultural production, exports of goods and services, and other indicators - as an independent.

In the future, we will adhere to the following notation: Y-dependent variable; X – independent variables; - the number of the studied trait. As initial information for modelling, we use the actual data presented in Table 1 [2. S. 18, 24, 49, 72].

Table 1. Share of business in GDP and factors influencing it in the Republic of Uzbekistan (in percentages)

Years	Share of business in GDP	Share of business in the number of employees	Share of business in output product agricultural	Share of business in export volume
	Y	X_1	X_2	X_3
2000	31,0	49,7	73,6	10,2
2001	33,8	51,8	74,5	9,3
2002	34,6	53,5	74,9	7,5
2003	35,0	56,7	78,1	6,9
2004	35,6	60,3	81,1	7,3
2005	38,2	64,8	85,7	6,0

2006	42,1	69,1	94,0	10,7
2007	45,7	72,1	97,6	14,8
2008	48,2	73,1	97,7	12,3
2009	50,0	73,9	97,8	14,6
2010	52,5	74,3	97,8	13,6
2011	54,0	75,1	97,7	18,8
2012	54,6	75,6	97,8	15,7
2013	55,8	76,7	98,0	18,0
2014	56,1	77,6	98,3	26,0
2015	56,7	77,9	98,4	26,9
2016	56,9	78,1	98,5	28,5

A visual study of the development dynamics of each of the factors makes it possible to formally record the dependence of the share of business in GDP on the factors affecting it as follows [3]:

$$Y = a_0 + a_1X_1 + a_2X_2 + a_3X_3 + \varepsilon$$

where Y - share of business in GDP; X_1 - the share of business in the number of people employed in the economy; X_2 - the share of business in the volume of agricultural production; X_3 - share of business in the volume of exports of goods and services; a_i - desired parameters (i =1,3); ε - the share of business in the volume of unaccounted factors.

To compile the regression equation of the process under study, a multiple correlation-regression analysis was carried out, the results of which are given in Table. 2.

Table 2. Calculation results of a correlation-regression analysis

№	Indicators	Y	X_1	X_2	X_3
1	Sum	780,8	1160,3	1541,5	247,1
2	Mean	45,9	68,3	90,7	14,5
3	p-value	0,64	0,03	0,57	0,01
4	Multiple Regression Coefficients	R= 0,979			
5	R2 determinism coefficient	0,959			
6	Normalized R-square	0,950			
7	standard error	2,121			
8	t - statistics	-0,5	2,4	-0,6	2,9
9	Multiple odds	a_0 =-3,8	a_1 = 0,9	a_2 = -0,2	a_3 = 0,44
10	standard error	8,1	0,4	0,3	0,1

Thus, according to the results of the correlation-regression analysis, the regression equation has the following form:

$$Y = -3,8 + 0,9X_1 - 0,2X_2 + 0,4X_3 + \varepsilon$$

The significance of the resulting multiple regression equation is evaluated using Fisher's F-test:

$$F = \frac{D_{факт}}{D_{ост}} = \frac{R^2}{1-R^2} \bullet \frac{n-m-1}{m}$$

Where $D_{факт}$ - the factorial sum of squares per degree of freedom;

$D_{ост}$ - residual sum of squares per degree of freedom;

R^2 - coefficient of multiple determination;

m - number of parameters for variables x;

n - number of observations.

$D_{ост}$ - residual sum of squares per degree of freedom;

R^2 - coefficient of multiple determination;

m - coefficient of multiple determination;

n - number of observations.

For m > 3 and 17-3=14, the degree of freedom F - the Fisher distribution is equal to:

$$F = \frac{0,959^2}{1-0,959^2} \bullet \frac{17-3-1}{3} = 49,6$$

According to Fisher's criteria, the actual significance of the equation is greater than in the Fisher table (Ftable 3.20). In addition, to determine the adequacy of the compiled model to the process under study, the theoretical values of the dependent factor are calculated, substituting the values of independent factors for the period under study into the resulting regression equation. The sums of the actual and theoretical values of the dependent variable must be equal. The results of calculating the theoretical values of the dependent variable are given in Table. 3.

Table 3. The results of calculating the theoretical values of the share of business in GDP in the study period

Years	Y	X_1	X_2	X_3	$Y = -3,8 + 0,9X_1 - 0,2X_2 + 0,44X_3$
2000	31,0	49,7	73,6	10,2	30,7
2001	33,8	51,8	74,5	9,3	32,4
2002	34,6	53,5	74,9	7,5	32,7
2003	35,0	56,7	78,1	6,9	34,6
2004	35,6	60,3	81,1	7,3	37,5
2005	38,2	64,8	85,7	6,0	40,2
2006	42,1	69,1	94,0	10,7	44,3
2007	45,7	72,1	97,6	14,8	48,1
2008	48,2	73,1	97,7	12,3	47,9
2009	50,0	73,9	97,8	14,6	49,6
2010	52,5	74,3	97,8	13,6	49,5
2011	54,0	75,1	97,7	18,8	52,5

2012	54,6	75,6	97,8	15,7	51,6
2013	55,8	76,7	98,0	18,0	53,6
2014	56,1	77,6	98,3	26,0	57,8
2015	56,7	77,9	98,4	26,9	58,5
2016	56,9	78,1	98,5	28,5	59,3
Σ	780,8				780,8

Fisher's criterion and the results obtained in Table. 3 confirm that the compiled model is significant, and it can be used to predict the share of business in GDP under the influence of the above factors X1, X2, X3.

To calculate the forecast values of the share of business in GDP, it is necessary to have forecast values of independent factors for the corresponding period. They can be determined by the method of analytical alignment of the initial series of independent factors by compiling an equation that describes the dynamics of the process. To solve the problem, a number of computational experiments were carried out to select the type of equations. The results of the experiment showed that the equation has the form $Xi = a_0 + a_1 t$.

So, as a result of calculating the parameters a0 and a1, respectively, the equations of independent factors X1, X2, X3, the dependence of the factors on time t is obtained, i.e.: $X\ t = a_0 + a_1 t$.

The dependence of the first independent factor ¬¬¬¬X1 - the share of business in the number of employees on time has the form: X1= 77.1+ 0.95*t;

- second independent factor X2; X2= 96.1+ 0.54*t;

- third independent factor X3; X3=18.2+1.01*t.

By substituting its values instead of t, we obtain forecast data of independent factors for the coming periods.

Substituting the obtained values into equation (2), we determine the share of business in GDP for the following periods. Thus, summarizing the results of calculating the dynamics of the development of the share of business volume in GDP, can be presented in the form of a Table. 4.

Table 4. Forecasting the values of the share of business in GDP

Years	Years Share of business in GDP	Share of business in the number of employees	Share of business in output product agricultural	Share of business in export volume
	Y	X_1	X_2	X_3
Actual condition				
2000	31,0	49,7	73,6	10,2
2001	33,8	51,8	74,5	9,3
2002	34,6	53,5	74,9	7,5
2003	35,0	56,7	78,1	6,9
2004	35,6	60,3	81,1	7,3
2005	38,2	64,8	85,7	6,0
2006	42,1	69,1	94,0	10,7

2007	45,7	72,1	97,6	14,8
2008	48,2	73,1	97,7	12,3
2009	50,0	73,9	97,8	14,6
2010	52,5	74,3	97,8	13,6
2011	54,0	75,1	97,7	18,8
2012	54,6	75,6	97,8	15,7
2013	55,8	76,7	98,0	18,0
2014	56,1	77,6	98,3	26,0
2015	56,7	77,9	98,4	26,9
2016	56,9	78,1	98,5	28,5
		Forecast results		
2017	60,3	84,9	98,7	38,0
2018	61,4	86,8	98,9	41,6
2019	62,6	88,7	99,1	45,7
2020	63,7	90,6	99,3	50,1
2021	64,9	92,4	99,5	53,7

The results of forecast calculations show an annual increase in the share of the business, which is no more than 2% compared to the previous one. At the same time, indicators of the share of business in GDP are closely related to indicators of the volume of agricultural production, with the share of exports and the number of employees. The projected share of business in the number of employees in 2017 will be 87.6%, and by 2021 this figure will be 95.2%. The most important indicator that affects the share of business in GDP is the share of business in the volume of agricultural production. The share of business in the volume of exports in 2017 will be 29.3%, and by 2021 it will be 37.4%. With this growth in business indicators in Uzbekistan, a positive trend in the development of the country's economy is expected.

IV. CONCLUSION

The introduction of business in Uzbekistan is a necessary and urgent task. The resources of private enterprises, their experience, incentives and other advantages can ensure rapid progress in the modernization of socio-economic infrastructure, without burdening the budget with heavy operating costs and a significant increase in public debt. The Action Strategy of the five priority areas for the development of the Republic of Uzbekistan in 2017-2021 is a continuation of institutional and structural reforms aimed at reducing the presence of the state in the economy; further strengthening the protection of rights and the priority role of private property; stimulating the development of small business and private entrepreneurship: ensuring reliable protection of the rights and guarantees of private property, removing all barriers and restrictions, providing complete freedom in the development of private entrepreneurship and small business; implementation of the principle "If the people are rich, then the state will be rich and strong." (Small Business Administration, 2015).

At the same time, business is a very delicate tool that requires experience and resolution of legal and procedural issues, as well as deep professional analysis. In Uzbekistan, at present, there are no legal, institutional, financial and personnel prerequisites for running a successful business on a full scale, adequate to the needs of the development of industrial and social infrastructure. Under these conditions, under the pressure of the urgent needs of the economy and limited budgetary funds, it would be a mistake to immediately begin the mass application of business in the infrastructure sectors of the country.

Business in Uzbekistan should develop by the program of economic reforms carried out in the country, including privatization, improvement of antimonopoly policy, decentralization of power, increase in the efficiency and targeting of social protection for all segments of the population.

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