



# Analysis of Dynamics of Development of Services in Uzbekistan

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## ABSTRACT

This article discusses the current role of the service sector, stages of development, many reforms, advantages and disadvantages of the industry, as well as changes in this area in Uzbekistan, the strategy of reforms and training programs for qualified personnel. many topical issues are covered. In addition, the following article provides information on such necessary and easy-to-use applications. In particular, the activities, popularity, scope, evidence-based diagnosis and other features of the "Abu Bakr ar-Razi med servis" clinic in Kokand, which is based on the unique environment for the population, are briefly described.

## Keywords:

medicine, services, correlation coefficient, regression model, VIF-criterion, F-Fisher criterion, cost, revenue.

## Introduction

At present, radical reforms are being carried out year after year to ensure the peaceful and prosperous life of our people. If we look at each area, we can see radical changes. In particular, knowledge in the field of medicine is developing significantly. We know medicine to maintain and strengthen people's health, prolong life, prevent disease, in short, to cure every human ailment. In particular, medicine plays an important role in the theoretical and practical activities of mankind. Everyone wants to maintain and strengthen their health, as well as recover quickly when they become ill.

Today we can see that the development of electronic technologies has a direct impact on the medical field. In particular, the development of electronic technologies and applications provides a good opportunity to study medicine and keep abreast of the latest developments. Electronic medical records reduce the workload of medical staff and provide remote access to patient information. Recently, the use of mobile applications has

become very popular among medical students and medical professionals. In other words, in order to create more convenience for medical staff and students, many online applications are being introduced in our country.

It is known that a person's health depends in many ways on him, because the disease is often caused by a person's lifestyle, inability to protect their health, factors such as inadvertent exposure to unhealthy factors and failure to follow the rules of personal hygiene, malnutrition. Another serious problem in medicine is the lack of highly qualified personnel. Therefore, the regional administrations allocated grants from the local budget to train qualified specialists needed for their territory. The legal framework for transplantation of human organs has been considered and developed in our country.

In Uzbekistan, the scope of medical research in the study of internal and external diseases is expanding. Particular attention is paid to the expansion of remote services in all medical institutions, the transition of clinics and hospitals to electronic management, the

establishment of telemedicine services between specialized medical centers and their branches, and the further expansion of local facilities for diagnosis and treatment. In addition, the country has ample opportunities to open private medical clinics.

In particular, practical work is being done to increase the number of public-private partnership projects, to provide 170 district and city medical associations with computer tomographs, and to improve the skills of staff in their use. An example of this is the medical center "Abu Bakr ar-Razi med servis" in Kokand. This clinic was established on November 12, 2012. The main purpose of the center is to provide medical services to the population. We will continue our research on the example of "Abu Bakr ar-Razi med servis" clinic.

### Analysis of the relevant literature

The relationship between health and retirement has been extensively studied in the international context, especially with the US data. Models, estimation methods and available data have been developing since the 1980s but the core result concerning the importance of health remains unrefuted.

Poor health leads to earlier retirement, and this effect is non-linear (Cai, Kalb, 2007; Sickles, Taubman, 1986). Regarding its relative magnitude, the results vary: depending on the data and methods, the effect of health was found to be relatively weak compared to economic factors (Bazzoli, 1985) or, on the contrary, health was declared the strongest factor (Dwyer, Mitchell, 1999; Jones et al., 2010).

Health seems to be a multidimensional factor, and different health indicators as well as different health conditions have different and independent effects on retirement (Au et al., 2005; Bound, 1991; Dwyer, Mitchell, 1999; Kalwij, Vermeulen, 2008).

Bound et al. (1999) explore the relationship from a dynamic perspective and show that the earlier the health shock occurs, the less likely it is to effect retirement. Lagged health level, in contrast with lagged health

shock, was found to be significant in the decision to retire (Au et al., 2005).

Retirement may also be modeled in a household context to account for possible correlation between decisions of spouses and added worker effect: when women experience a health shock, their husbands were found to increase their labor supply (Coile, 2004).

Results regarding the endogeneity of health with respect to retirement are less conclusive. Most articles claim no direct effect of labor force participation on health (Cai, Kalb, 2007; Sickles, Taubman, 1986; Stern, 1989). However, agreement is not universal and the results leave room for interpretation, because an insignificant coefficient does not necessarily mean the absence of a direct effect if it is offset by other factors. Cai (2010) discovers a significant effect of labor force status on health, which, however, is different for men and women and works in the opposite direction. Previous work history also influences current health (Cai, Kalb, 2007; Lindeboom, Kerkhofs, 2009).

Another source of endogeneity is the unobserved factors that affect both health and retirement (Bound et al., 1999; Cai, Kalb, 2007; Campolieti, 2002; Kalwij, Vermeulen, 2008). In this case, the imposition of the independence assumption between the two equations leads to an underestimation of the effect of health (Cai, Kalb, 2007).

The third source of endogeneity is justification bias: for social, psychological and economic reasons retired people may exaggerate their health problems as a way of justifying their retirement. There is evidence both in favor (Au et al., 2005; Jones et al., 2010; Lindeboom, Kerkhofs, 2009) and against (Dwyer, Mitchell, 1999) the presence of justification bias.

Research regarding Russia, and emerging countries in general, is quite scarce, and the findings from articles based on developed countries may be different due to differences in settings. For instance, health may be more important in less developed countries (Currie, Madrian, 1999).

The main result of the significant influence of health on retirement is found for

the Russian elderly (Gurvich, Sonina, 2012; Lyashok, Roshchin, 2015; Nazarov et al., 2014; Goryakin et al., 2014; Goryakin, Suhrcke, 2017). It is stronger for men, urban residents, less educated and near retirement age people (Goryakin et al., 2014; Goryakin, Suhrcke, 2017), and the influence of a health shock accumulates over time (Lyashok, Roshchin, 2015).

### Methodology

The study used data from the "Abu Bakr ar-Razi med servis" clinic in Kokand, Uzbekistan. Information on total receipts, total expenses for 2013-2020, 1st therapy inpatient treatment, 2nd therapy inpatient treatment, CT and X-ray, UTT, laboratory and other departments, as well as the total number of admissions by departments data were collected. In the study, the total yield as  $Y$ , 1st therapy inpatient treatment as  $X_1$ , 2nd therapy inpatient treatment as  $X_2$ , CT and X-ray as  $X_3$ , UTT as  $X_4$ , laboratory as  $X_5$ , other departments as  $X_6$ , departments as  $X_7$ . The total number of admissions and the total cost are used as  $X_8$ .

The study also uses a multifactor regression model. The multivariate regression model is characterized by:

$$Y = \alpha_0 + \alpha_1 * x_2 + \alpha_2 * x_4 + \dots + \alpha_p * x_p + \varepsilon$$

Thus, the written model is linear in appearance and therefore it is a linear regression model. In this study, the classical linear regression model (CLRM), determination ( $R^2$ ), correlation coefficients ( $r_{y/x}$ ), VIF-criterion, Darbin-Watson test (DW) and Fisher criterion (F-distribution) "Abu Bakr ar-Razi med servis" clinic were studied data on the empirical probability of the assumptions are considered.

### Results and discussion

In the study, a table was formed using the data of the total revenue, total costs and total number of admissions by departments of the clinic "Abu Bakr ar-Razi med servis" in Kokand, Uzbekistan for the months of 2013-2020. Based on the data, the correlation between the factors was examined. The following results were obtained

**Table 1**  
**Results of correlation analysis<sup>1</sup>**

	$Y$	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	$x_8$
$Y$	1								
$x_1$	0,990	1,000							
$x_2$	0,986	0,958	1,000						
$x_3$	0,986	0,989	0,948	1,000					
$x_4$	0,986	0,958	0,999	0,948	1,000				
$x_5$	0,991	0,997	0,955	0,997	0,955	1,000			
$x_6$	0,986	0,958	0,999	0,948	0,999	0,955	1,000		
$x_7$	0,985	0,980	0,958	0,987	0,958	0,987	0,958	1,000	
$x_8$	0,935	0,941	0,903	0,939	0,903	0,943	0,903	0,911	1

<sup>1</sup>Author's account.

The relationship between the main factor  $Y$  and the factor influencing it  $X_1$  is 99.0%. The correlation between the main factor  $Y$  and the factor influencing it  $X_2$  is 98.6%. The correlation between the main factor  $Y$  and the factor influencing it  $X_3$  is 98.5%. The correlation between the main factor  $Y$  and the factor influencing it  $X_4$  is 98.6%. The correlation between the main factor  $Y$  and the factor influencing it  $X_5$  is 99.0%. The correlation between the main factor  $Y$  and the factor influencing it  $X_6$  is 98.6%. The correlation between the main factor  $Y$  and the factor influencing it  $X_7$  is 98.4%. The correlation between the main factor  $Y$  and the factor influencing it  $X_8$  is 93.5%.

There are strong correlations between the underlying factor and the factors influencing it. That is, the results of the specific correlation coefficient must have a strong

correlation. However, the relationship between the influencing factors, ie the results of the double correlation coefficient, should have a weak correlation. In the study, the results of the double correlation coefficient have a very strong correlation, which suggests the presence of autocorrelation between the factors. To verify this, we use the VIF-criterion. Then, if the result of the VIF-criterion found in most literature is less than 10, there is no autocorrelation, and it is possible to create a model using these factors.

In the study, factors with a small VIF-criterion value of 10 were found to be  $X_3$ ,  $X_4$ ,  $X_6$ ,  $X_8$ . At the same time, based on the reconstructed table, empirical models were created and their parameters were found using the Stata12 program (Figure 1). For "Abu Bakr ar-Razi med servis" clinic multifactor regression models were developed

$$Y = \alpha_0 + \alpha_1 * x_3 + \alpha_4 * x_8 + \varepsilon \quad (1)$$

$$Y = 2896736 + 1.970813 * x_3 + 0.0247568 * x_8 + \varepsilon \quad (2)$$

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. reg y x3 x4 x6 x7 x8
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Source	SS	df	MS	Number of obs = 96		
Model	1.9915e+17	5	3.9830e+16	F( 5, 90) =14547.10		
Residual	2.4642e+14	90	2.7380e+12	Prob > F = 0.0000		
Total	1.9939e+17	95	2.0989e+15	R-squared = 0.9988		
				Adj R-squared = 0.9987		
				Root MSE = 1.7e+06		

y	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x3	1.970813	.1262866	15.61	0.000	1.719922	2.221703
x4	-297.1441	201.2421	-1.48	0.143	-696.9466	102.6585
x6	451.2675	301.8803	1.49	0.138	-148.4704	1051.006
x7	890.0059	2099.207	0.42	0.673	-3280.434	5060.446
x8	.0247568	.0116609	2.12	0.036	.0015905	.0479232
_cons	2896736	822703.7	3.52	0.001	1262292	4531181

Figure 1. Results of regression analysis<sup>2</sup>

<sup>2</sup>The calculation found by the author through the Stata12 application.

Based on the results of the above regression analysis, only the factors influencing the reliability coefficients  $X_3$  and  $X_8$  of the parameters were positive. Based on this result, an increase of 1 unit in  $X_8$  (total costs) in the direct multi-factor regression model means that the revenue will increase by 0.024 units on a probabilistic basis when the other factors are zero. If the increase in CT and X-ray sections by 1 unit, ie other factors are equal to zero, the volume of the increase in stochastic means by 1.97 units. If the factors  $X_3$  and  $X_8$  are zero, the amount will directly increase the revenue by 2,896,736 soums. Also, the coefficient of determination ( $R^2$ ) explains the selected linear function or the resulting sign variance of the structured model. It follows that the

determination value of Equation 2 is 0.9988, i.e., the variance of the resulting sign determined in the selected regression equation is 99.88%, and the variance of other factors ignored is 0.12%.

Thus, we determine the autocorrelation in the remainder of the equation and calculate it according to the common Darbin-Watson (DW) criterion. According to Equation 2,  $dw = 0.04$ . In the regression equation with 2 independent variables, the values in the Darbin-Watson table are 1.62 and 1.71. Hence, the calculated value for this equation is 0.04, which means that we cannot make a definite conclusion as to whether there is an autocorrelation

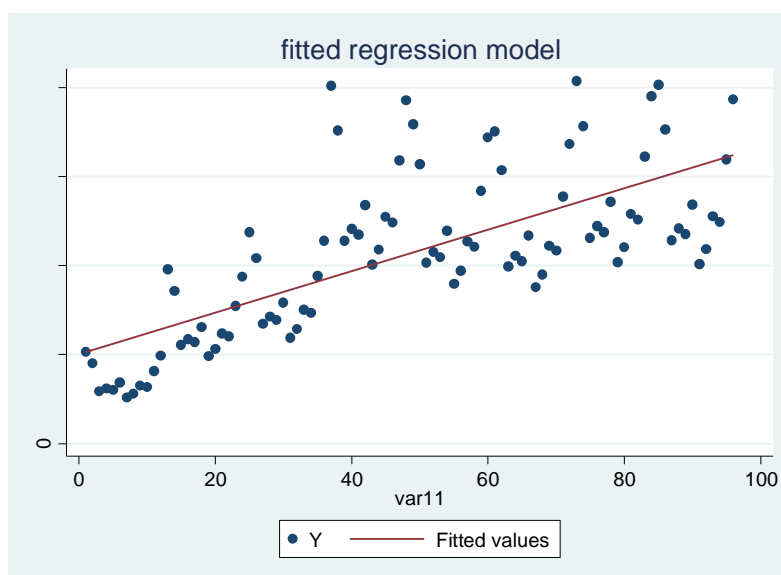


Figure 2. Linear regression model graph<sup>3</sup>

<sup>3</sup>Author's development

The statistical significance of each new factor included in the model for the model can be verified using a special F-criterion. Hence, it is possible to assess the significance of each factor included in the regression model, but not the whole equation by the Fisher criterion (F). The need for such a check arises from the introduction of new variables into the model. The point is that not all of the new factors introduced into the model significantly increase the explanatory part of the variance of the explanatory variable. Furthermore, when several factors are involved in a model, they can be included in the model in a different order. According to the inter-factor correlation, the statistical significance of a single factor may depend on how many places it is included in the model. According to Equation 2,  $F_{hat} = 14547.10$ , which means that the Fisher criterion is large in the table value and each factor is significant.

### Conclusions and suggestions

In this study, the main factors influencing the increase in revenue through correlation-regression analysis of the clinic "Abu Bakr ar-Razi med servis" CT and X-ray department and total costs were reflected. At the same time, it is necessary to further develop and expand the main CT and X-ray department to increase revenue. There will also be an increase in direct costs.

Based on the results of the above regression analysis, a multi-factor regression model was developed to increase the number of admissions to 76,752 people and increase the clinic's costs by 4.9 billion. soums. In conclusion, the further development of medicine and services in our country, the provision of quality services to the population remains a topical issue today. With this in mind, we must continue to expand and modernize the clinic, which will be beneficial to both our people and the entrepreneur.

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