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In terms of sectors, services and manufacturing have been one of the key factors of economic growth during the involved period, while the significance of agriculture in provision of economic growth has been decreasing during the recent years.

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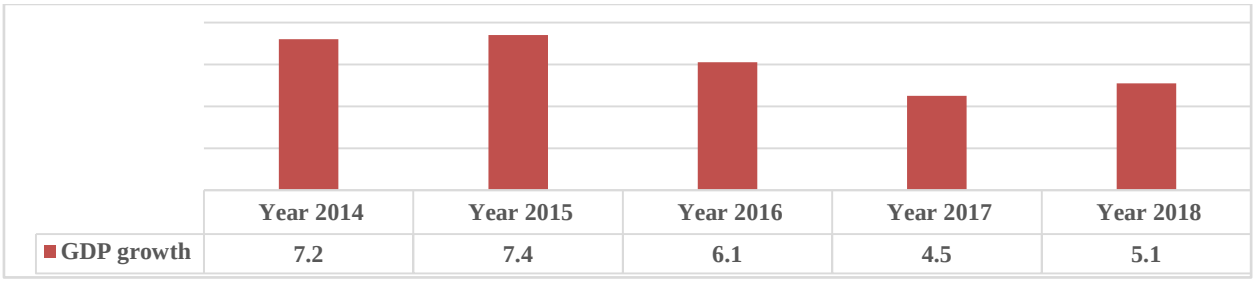
Abstract- The purpose of this paper is to decompose the economic growth of Uzbekistan between 2009-2018 using Cobb-Douglas production function and the value added method. The results show that even though the growth of capital resources has been a key factor in ensuring economic growth of Uzbekistan in recent years, the total factor productivity and labor provided comparatively marginal but consistent contribution to the economic growth over the years.

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I. Introduction

One of the natural ways to address social and economic problems in the community is to ensure sustainable economic growth. An increase in the welfare of the population is positively correlated with the level of economic growth in the country. Therefore, there is no doubt that an analysis of the factors promoting economic growth plays an important role in ensuring sustainable economic growth for developing countries. It also helps developing countries take sensible political measures in achieving the levels of the developed economies. Since its independence, Uzbekistan has been recording different trends in its economy. For example, if we look at the indicators of Uzbekistan's economic growth in the past five years, the following graph shows that GDP growth rates are not less than 4 per cent for the last five years. In particular, in 2014 and 2015 the annual GDP growth was above 7%, however, this figure was relatively low in recent years.

Uzbekistan's GDP growth between 2014-2018



	Year 2014	Year 2015	Year 2016	Year 2017	Year 2018
GDP growth	7.2	7.4	6.1	4.5	5.1

Source: State Statistics Committee of Uzbekistan

There is no doubt that in analysis of GDP growth it is important to analyze the factors influencing growth. In fact, there are several ways to analyze factors leading to economic growth in world practice.

One of them is the evaluation using the value added method. It decomposes the economic growth taking into account the value added of the sectors of economy. The advantage of this method is that it clearly shows which sectors are contributing most to the GDP growth. It also can serve as a helpful tool for policy makers to implement measures to ensure sustainable economic growth.

Another widespread method to decompose GDP growth is based on expenditure approach. It provides possibility to identify what factors such as consumption, government spending and investment are contributing most to economic growth. The advantage of this approach is that it provides flexibility for the development of appropriate strategies and measures to ensure economic growth, taking into account the cost efficiency of various economic systems. In addition, today the Cobb-Douglas model, developed by advocates of Neo-classical schools, is widely used by many economists to analyze economic growth. With this model, the country's economic growth can be analyzed through production factors such as labor, capital or technological development, or in other words total factor productivity.

In general, this study aims to analyze core factors forming GDP growth. The next section will bring some studies done on the decomposition of economic growth.

II. Literature Review

In fact, there have been numerous similar studies conducted on assessment of economic growth,

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but they mostly differ from one another due to the factors involved into analyses and methodologies.

For example, a researcher at the University of Victoria, Steve McNeill (2013) his paper, titled "*the decomposition of China's GDP growth*", analyzed the value of the average product size for each of the workers, the importance or significance of increasing or decreasing the productivity and investment volumes. He believes that decomposition of economic growth can only be realized when there is a macroeconomic function that indicates the dependence of technology and production factors on maximal product production. According to his view, in 1965, the growth of production of per worker was 6.5%, and in the last ten years it grew by at least 9% on average.

Likewise, Li et al. (2015) found that the stable growth of capital and TFP were key factors in expaining China's manufacturing growth during the period from 1965 to 2010. Additionally, he analyzes the growth while excluding capital investment. Here this method is called the capital accumulation, explaining the size of the newly invested capital for the previous period by deducting the depreciation rate.

Moreover, Hekman and Yi (2012) point out that the Chinese workers' capital is based on the size of capital per worker, and the share of capital gains from economic growth is justified by a one-percent increase in capital growth. The main reason for this is the hypothesis that investments have played a major role in boosting the volume of production in China when compared to the year 1994. They come up to the formula, explaining how much the gross product responds to the change in investment. They concluded that to increase the gross domestic product by $ 1 billion, there is need of $ 4 billion investments. Traditionally, if investment coefficient is less than 0.4, the level of investment will be very low. It clearly shows that investment and capital growth was not a main factor in providing Chinese economic growth.

Also, Ch. Kobb and P. Douglas analyzed the performance of the US manufacturing industry for the years 1899-1922, and determined main production factors. The results of the research indicate that an increase in capital expenditure by 1% in the US manufacturing industry led to an increase in production by 0.25% while a rise of labor force in the industry provided 0.75% growth of gross production.

In summary, the use of the Cobb-Douglas production function is one of the most widely used methods in decomposition of economic growth.

III. Empirical Methodology

In the assessment of economic growth, existing quantitative, qualitative and compound methods are used, with respect to factors affecting growth. Each of these methods has its own specificity.

The factors affecting economic growth can be conditionally divided into two groups. The first group of factors are called supply factors, determine the economic growth capacity:

- quantity and quality of natural resources;
- quantity and quality of workforce resources;
- the size of fixed capital (fixed assets);
- technological development.

Each of these factors can describe economic growth through the impact on GDP growth. It is known that GDP is a function of labor, capital and natural resources:

$$Y = f(L, K, N)$$

where:

- Y - gross domestic product;
- L - workforce;
- K - capital expenditure;
- N - use of natural resources.

Based on the formula, we can derive other specific indicators that determine economic growth:

- labor productivity (Y / L) - ratio of gross domestic product to labor force;
- labor-intensity (L / Y) - labor force to gross domestic product;
- capital efficiency (Y / K) - the ratio of gross domestic product to capital expenditure;
- capital-intensity (K / Y) - ratio of capital expenditures to gross domestic product;
- effectiveness of natural resources (Y / N) - the ratio of production volumes to the costs of natural resources spent;
- capacity of the product (N / Y) - the ratio of natural resources to the volume of production;

These indicators reflect the contribution of each factor to the growth of gross output, which is determined as follows:

$$Y = (\Delta Y / \Delta L)L + (\Delta Y / \Delta K)K + (\Delta Y / \Delta N)N$$

Economic growth is also influenced by distribution factors. In order to effectively use the production potential, it is necessary not only resources to be fully involved in the economic process, but also to be used effectively. It is also necessary to make real use of the growing resources of the resources and to distribute them in absolute terms. The production function, which was created based on the neoclassical view, American economist P. Douglas and mathematician Ch. Cobb. The Cobb-Douglas model attempts to determine the contribution of various factors of production growth in the following:

$$Y = AK^{\alpha}L^{\beta}$$

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Here:

- Y - production volume;
- K - capital expenditure;
- L - labor;
- A – coefficient of production function (technological growth);
- and β are the elasticity coefficients of labor force and capital expenditures.

The elasticity coefficient represents the value of variation of another indicator as a result of the change in the size of one index. Accordingly, α 1% increase in capital expenditure indicates a percentage increase in output, and a 1% increase in labor costs shows an increase in output. The sum of α and β shows an increase of production, when labor and capital expenditure inclined by 1 %. The Cobb-Douglas production function was further refined by the Dutch economist Jan Tinbergen, who introduced a new factor - technical progress. As a result, the output function formula looks like this:

$$Y = AK^{\alpha}L^{1-\alpha}e^{rt}$$

Here:

E – Time factor

The introduction of the time factor into the production function has now made it possible to reflect not only quantities but also qualitative changes - the so-called “technical progress” - increased workforce skills, increased innovation processes, improved production organization, increased public awareness and more.

If the Cobb-Douglas formula for the base period is logarithmic, it looks like this:

$$\ln Y_t - \ln Y_{t-1} = \ln A_t - \ln A_{t-1} + \alpha(\ln K_t - \ln K_{t-1}) + (1-\alpha)(\ln L_t - \ln L_{t-1})$$

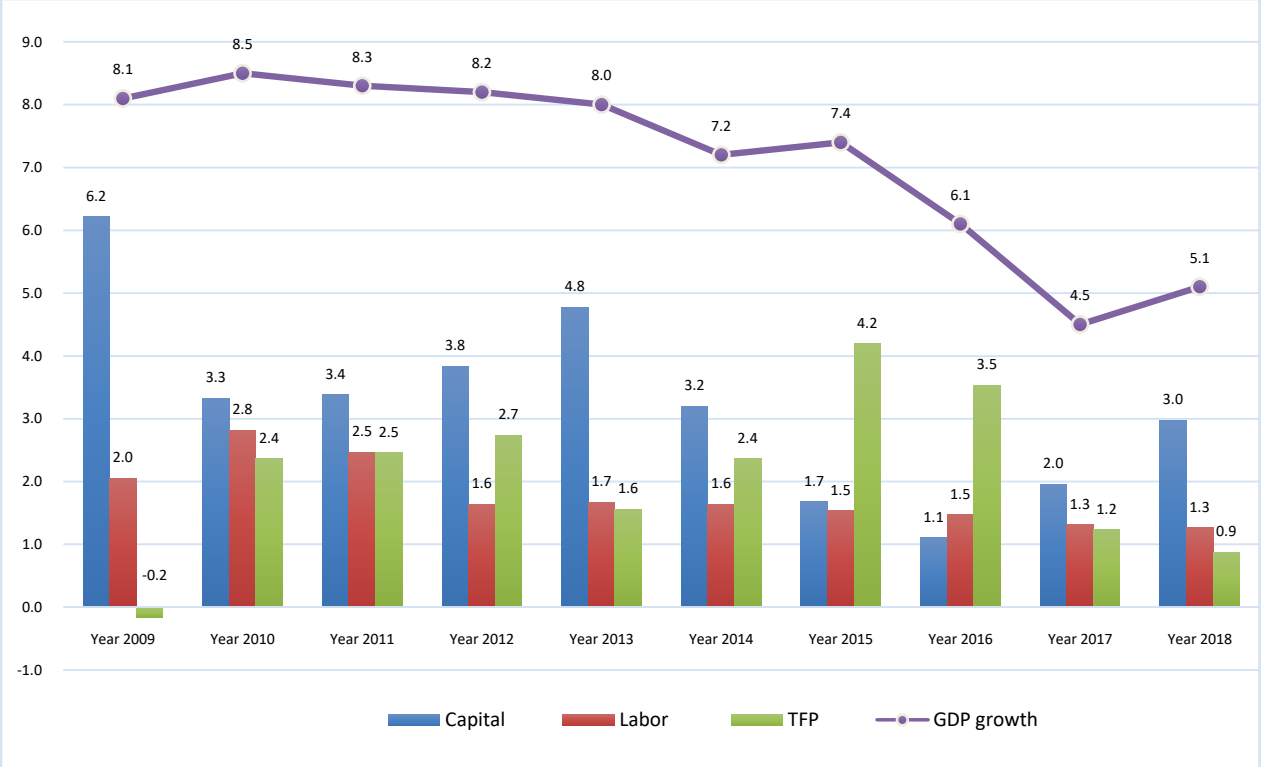
This can be explained as follows: Growth in the real value of GDP is the sum of the total factor efficiency, multiplication of fixed capital growth by its elasticity, and multiplication of labor growth by its elasticity.

As part of this study, the estimation of economic growth decomposition is performed using the Cobb-Douglas production model described above.

IV. Discussion of Results

The analysis of economic growth in Uzbekistan over the last 10 years, 2009-2018, using the above methodologies shows that the significance of the factors contributing to economic growth has been relatively constant over the period under review. In particular, although the growth of capital resources in the economy has been recognized as a key factor of economic growth from 2009-2014, it can be seen that economic growth over the last 2 years has been largely driven by increased scientific and technological development. That is, during 2015 and 2016, economic growth was 7.4 and 6.1 percent, respectively, of which 4.2 and 3.5 percent were due to improved overall productivity. Owing to the active investment policy implemented in the country over the last two years, we can stress that the sharp increase in investment capital is also reflected in economic growth. In particular, 2% of 2017 economic growth, or about 45% of total growth, and 3% in 2018, or 59% of total growth, were due to an increase in capital resources in the economy. During these years, the development of science and technology has slowed down to a slower rate of improvement in overall productivity, reaching 1.2 and 0.9 percent, respectively. It should be noted that a steady growth of the labor force in the economy has also played an important role in maintaining GDP growth over a 10-year period. The contribution of the labor force to economic growth was 1.6% on average during the study period.

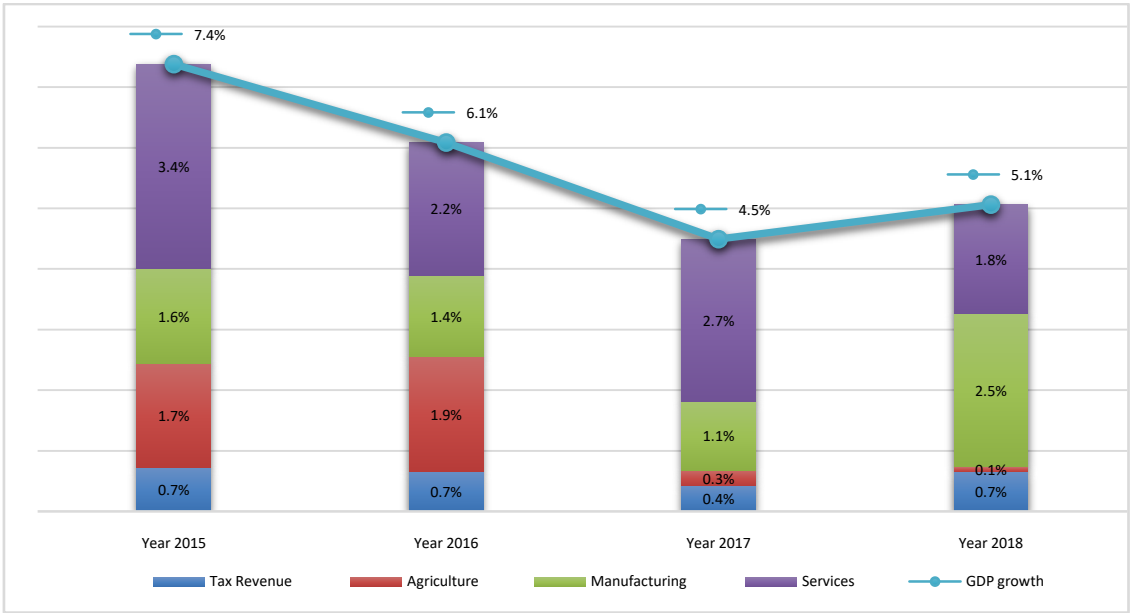
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Source: the author's own calculations based on data from the World Bank and State Statistics Committee of Uzbekistan.

Another objective of the study was to assess the economic growth by using decomposition methods. Therefore, in the last four years, the contribution of the sectors to economic growth can be attributed to the fact that the share of services in GDP growth has been at the highest levels, excluding the year 2018. For example, in 2017 the economic growth was 4.5 percent, while the contribution of the services sector was 2.7 percent, or 60 percent of total growth. By 2018, the share of services in GDP growth was relatively low - at 1.8 per cent, while the combined share of industry and construction accounted for nearly half of GDP growth.

Moreover, it should be pointed out that the share of agriculture in GDP growth has declined sharply over the last two years of the research period. For example, if the figure is 1.9 percent in 2016 or a third of GDP growth in 2016, it's only 0.1 percent by 2018.



Source: the author's own calculations based on data from the World Bank and State Statistics Committee of Uzbekistan.

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V. Concluding Remarks

As it is seen from the above, the economy of Uzbekistan has grown in recent years mainly due to the increase of capital resources. Therefore, in provision of long-term sustainable economic development in Uzbekistan, it is necessary to sustain large-scale investment projects aimed at increasing the capitalization of the economy. At the same time, taking into consideration the decline in the overall effectiveness of GDP in the last few years, it is necessary to envisage increasing public activity focused on increased expenditures on the development of science and technology.

Also, it is known that almost one-third of the population of Uzbekistan is engaged in agriculture but this sector is also significant in GDP, by 32 percent in 2018. Nevertheless, its contribution to economic growth has dropped dramatically in recent years. This, in turn, has led to the increase of the role of other sectors in the formation of economic growth. Moreover, when looking at the economies of the developed countries, the sectors that form the GDP and provide economic growth today are mostly the services and industries, as the majority of their population is involved in those sectors.

Overall, one can be said that in the near future, in the urgency economic development acceleration, the focus should be on improving the sectors such as services and industries listed above in the development of promising economic development.

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