



## Systematic Simulation of Econometric Modeling of The Regional Industry Sector

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ABSTRACT

Systematic simulation of econometric modeling of the regional industry sector and its econometric analysis are presented.

**Keywords:**

Systematic simulation, econometric modeling, regional industry sector, GDP, Consumer, Control object

For developing countries, the development of the service sector is considered one of the most effective ways to improve the living standards of the population. The main task consists not only to increase the share of services in GDP, but also to expand its structure, to increase employment of population, to develop modern forms and technologies of services which fully satisfy the needs of the population.

The bulk of the employed population in developed countries, in particular, "80 percent in the United States and more than 70 percent in

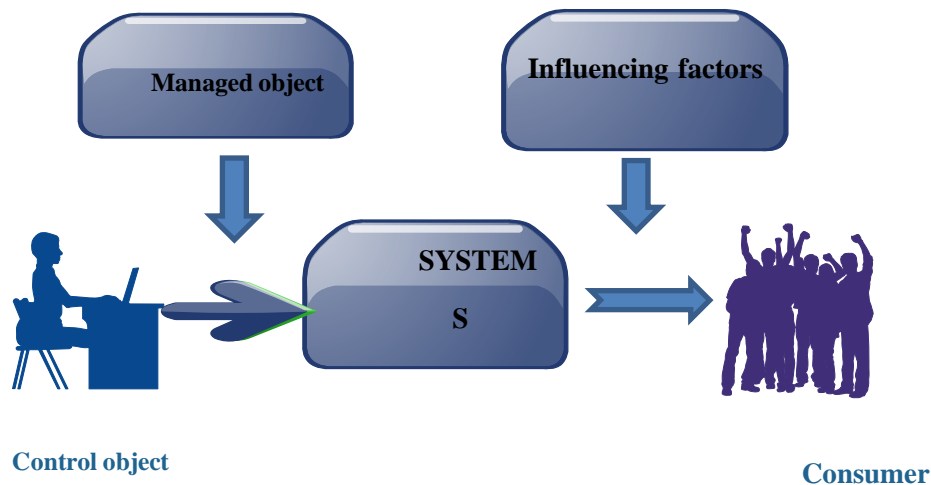
Japan, include share of the service sector"<sup>1</sup>.

On the other hand, a number of U.S. companies own at least 50 percent of their manufacturing revenue through the sale of services which are related to manufacturing<sup>2</sup>.

Using Figure 1 gives opportunity to accept analytical or imitation approaches which are developed in the form of appropriate language for modeling continuous systems or using analog and hybrid computational techniques in forming the process of continuous-determined  $S$  systems activity and evaluating their basic characteristics.

<sup>1</sup> <http://www.statista.com/statistics/270072/distribution-of-the-workforce>.

<sup>2</sup> Тараққийётнинг ўқ илдизи ёхуд хизмат кўрсатишнинг мамлакат имижини оширишдаги муҳим роли хусусида // <http://uza.uz/oz/business/-07-09-2019>.



2.рaсм. S- A human-machine simulation system.

The importance of econometric modeling of public service sectors is reflected in the followings:

The material, labor and monetary resources are rationally used;

It serves as a leading tool in the analysis of economic and natural processes;

it will be possible to make some adjustments during the forecasting of the development of public service sectors;

It gives opportunity not only in-depth analyzing service sectors, but also discovering their unexplored new laws. They can also be used to predict the future development of service sectors;

It facilitates mental work along with the automation of computational work, creates the opportunity to organize and manage the work of personnel of service sector on the scientific basis.

In our opinion, there are the following actual issues which are waiting for their solution, in the development of the service sector: identifying classification of the types of services which are provided to the population, evaluating the nature of the service sector, developing a system of indicators of service sectors in current situation, improving the process of econometric modeling of development of public service sectors and forecasting it through them.

Human creates and serves the object of

service to himself. Because of this, it is possible to introduce the belief that services are for the human and performing the service is also a human. This means that both the producer of the services and its consumer are also human. This can be expressed as follows:

It is known that as a result of the service, the GDP of country will increase. This will be done in the following directions: a gross domestic product will be created in the conditions of market relations, as a result of service, irrespective of creating or non-creating a material wealth. Therefore, it is expedient to look at services not from the point of view of the creation of material wealth, but from the point of view of the creation of gross domestic product.

In the modern era of development of social and service sectors, the provision of services is gaining popularity. Therefore, the labor efficiency per unit of achieved output is required to be able to calculate fixed assets, material and financial costs.

Production and services have long been a part of human economic activity, social community life. The interaction among people as a social community institution of services, the existence of useful activities - are considered necessary condition of society and life of human. It should be noted that it is not exaggeration if we say that services will increase the level of development of society, not only at the level of

its productive forces, but also taking into account its spiritual and enlightenment status.

In this study, we will mark public service sectors as a system by improving the development models of public service sectors as a basis for systematic analysis. At the same time, we consider a single object and the types of services as a collection of collected elements in order to achieve the goal. Namely, we will systematically study to increase the efficiency of public services and living conditions. These researched types of services are understood as interconnected integrity in their integrity. As a result of systematic analysis, the economic-effectiveness indicator will be determined.

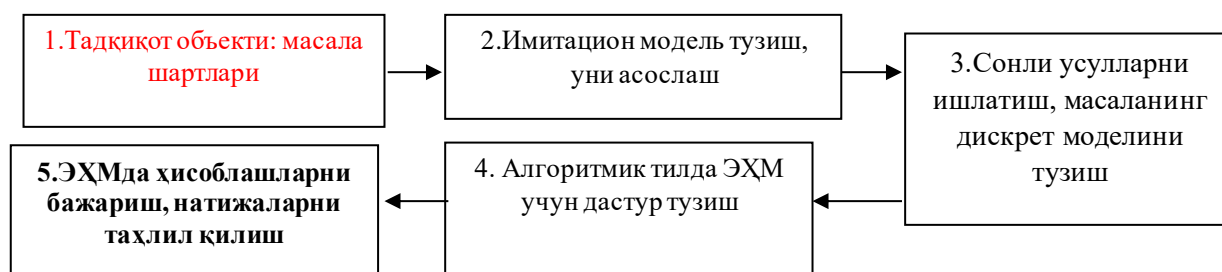
It should be noted that the attitude of the population to the service sector is formed in the conditions of social ownership to production tools, a single centralized system of economic movement, limited economic independence of

enterprises.

In the condition of market economy, service enterprises operate in a variety of forms of ownership, full economic independence and competitiveness. This market involves the flexible use of different methods of householding management and the choice of econometric models of service, in this case, it creates opportunity for rapid adaptation to changes in the external environment in a competitive environment.

Our goal consists of analyzing the service sectors in the region and improving its models.

I. First of all, modeling gives opportunity to express a large and complex system using a simple model. The process of providing services to the population is a very complex system. It can be expressed through a systematic analysis scheme (Figure 1).



1-расм

#### -расм. Тизимли таҳлил схемаси

The mechanism of public service can be described graphically. Of course, this creates many problems.

II. The wide field is created for making experiments with the structure of the econometric model of public service sectors. We can determine the most optimal state of activity of service enterprises by changing several times the parameters of the model. We can experiment on electronic computing machines through this model and then we can apply it in life.

Experimenting on real objects can lead to many mistakes and huge costs.

III. The service sectors will be studied and analyzed in detail in order to create a

model. After the model is created, it can be obtained new information about processes of service sector with using it. Thus, the process of service sector becomes a continuous process.

A systematic methodology of complex problems in the field of services is developed on the basis of a systematic approach and general concepts. During the analysis, we take into account the internal and external environment of the service sectors. This means that it must be taken into account not only internal factors, but also external factors such as economic, geopolitical, social, demographic, environmental and other factors.

Each system of the service sector includes its own service elements, while at the same time it reflects the low-level subsystem elements. In other words, the elements of the

service sector will be interconnected with different systems in many ways, without interfering with each other.

The systematic approach is expedient for each element of its structural structure in ensuring the completeness of the public service system.

In order to do this, the service sector is considered as a complex system, quantitative and qualitative aspects of its expression laws are studied. Imitation has important role in the analysis of the activities of the service sector which is considered as a complex economic process.

The imitation model is constructed for each sector to predict the future state of the public service sector. The following tasks should be done in order to do this:

- forming database of service sector networks and factors which influence it;

- identifying the relationship between each service sector and the factors which influence it, the factors which influence it;

- developing a separate model for each service sector;

- examining developed models according to evaluation criteria;

- forming a database forecast on the basis of certain legitimacies of factors which influence forecasting through models which are considered significant;

- achieving outcome factors on the basis of databases and models.

In this case, special functions are reviewed, attention is paid to the algorithms of system operation. It is implied the properties which lead to the goal as function. In this case, performing functions of the system are evaluated on the basis of a functional approach. It creates opportunity to determine the activity

of the system, to determine its status, to mark the management legitimacies of systems. An important aspect of this is considered appearing hierarchical subordination among these parts and reflecting it in the relative independence of these parts. This will help the population to develop an integrated systematic imitation model of all elements of its service sector on the basis of a single system.

Our task consists of evaluating the existence of strong and weak connections which influence the development of public service sectors. We use the correlation analysis method in order to perform this task. Because our goal is considered to evaluate the importance and reliability of the interdependencies which influence the development of each sector which serves the population. We measure the criterion of dependence which influences the living conditions of the population through correlation analysis, but we cannot determine the cause of the relationships.

We selected information which belong to the reporting years 2004 - 2018, these information identified the areas of service and the factors which influence them, on the basis of certain signs (Table 1).

In this case, the factors which influence the development of each service sector are separately divided in the modeling. Therefore, we took the development of some service sectors as a factor which influences to other service sectors. The impact of influencing factors affects service sectors in different degrees. Selected factors may be involved in modeling once or more. Because we consider one factor as the main factor which influences each service sector, and we can consider another factor as the main factor which influences only one service sector.

**Table 1.**

**Service sectors for the population of Kashkadarya region and the factors which influence them**

$Km_x$ - providing real estate services to the population of the region (in billion soums)	$Y_6$
$A_s$ - total number of the population of region (thousand people)	$X_1$
$I_{ba}$ - employed part of the population of the region (thousand people)	$X_2$
$A_d$ - total income of the population of region (in billion soums)	$X_3$
$K_m$ - capital investments of the population of the region (in billion soums)	$X_4$

We created the following functional view

on the basis of the service sectors in Table 1 and

the factors which influence them . A functional view of the empirical models which are structured for each sector of the service sector for the population of the region

$$Km_x = \varphi_6(A_d, K_m, Uyk_{xx}, M_x) + \varepsilon_6$$

$Km_x$  – providing real estate services to the

population of the region

We used statistical data from 2004 to 2018 to create multi-factoral empirical models through the service sectors for the population of Kashkadarya region and the factors which influence them.

**Table 2.**  
**Statistical data of the service sector of the population of Kashkadarya region**

$Km_x$ - providing real estate services to the population of the region $X_1$	total number of the population of region $X_1$	part of the population of the region $X_2$	total income of the population of region $X_3$	$T_{o'x}$ - providing education services to the
5,4	2378,2	769,4	541,7	3,9
7,8	2419,8	821,7	653,5	7,8
12,4	2462,2	850	850,3	11,9
14,1	2506,2	877,8	1068	15,2
18,3	2565,9	908,7	1376,6	18,9
26,7	2615,5	940,2	1803,4	32,3
31,4	2671	971,6	2380,4	39,3
40,6	2713,2	1003,7	2692,1	38,9
63,7	2762,3	1036,6	3186	46,2
89,5	2895,5	1072,3	3723,5	69,6
108,3	2958,9	1108,5	4304,4	89,8
136,9	3025,6	1143,9	4928,9	106,5
170,2	3089,4	1180,9	5597,1	131,1
191,3	3148,1	1218	6308,6	163,9
226,9	3186,8	1262,6	7063,8	227,8

The correlation matrix among the factors which influence the development of each sector

$$Y_6 = -16,856 + 0,088 * X_3 - 0,028 * X_7 - 0,472 * X_{13} + 0,087 * Y_2$$

t (-4,771) (8,456) (-5,193) (-4,717) (4,797)

We achieved the following efficiency when we analysed them with empirical models: As we can see from the table 13, the consistent implementation of the priorities which was set out in the Decree of our President "On the Action Strategy for the five priority areas of development of the Republic of Uzbekistan in

of the service sector in Kashkadarya region, was calculated in the program EvIEWS 9.

2017-2021", empirical models which is built in order to develop service sector to the population of Kashkadarya region in the future and forecasting results which are obtained with taking into account the ongoing reforms in this sector, show the followings:

**Table 3.**  
**Forecast of service sectors for the population of Kashkadarya region (billion soums / thousand soums)**

Indicators	2019 (real)	Forecast years					
		2020	2021	2022	2023	2024	2025
$Km_x$ – providing real estate services to the population of the region $Y_6$ / per capita	533,06	603,86	679,97	761,53	848,70	977,6	1171,3
	164,13	182,50	201,79	221,98	243,06	275,2	324,1
	23,86	30,51	39,46	51,52	67,81	89,8	119,4

Providing real estate services ( $Km_x$ ) will increase by 1,13 times in 2020 compared to 2019, and by 2,20 times by 2025;

Providing educational services ( $To_x$ ) is forecasted to increase by 1,32 times in 2020 compared to 2019, and by 4,85 times by 2025;

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