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Sanabarkhan Khafizovna Akhmedova

Institute for Retraining and Statistical Research of the State Committee on Statistics of Uzbekistan

Doctor of philosophy in economics (Ph.D.), Docent.

Department of «Digital economy»

## FUNCTIONING OF MODELS IN THE PROJECTED ARTIFICIAL INTELLEGE IN STATISTICS

**Abstract:** The current stage of economic development is characterized by a deep integration of economics, mathematics, and programming. The use of artificial intelligence in many economic systems, including statistical systems, the solution of many different tasks in them, is important both in practical processes and in research. In this paper, two models are presented, the implementation of which with the help of projected artificial intelligence reflects the importance and further development of this direction.

**Key words:** models, indicators, digital economy, matrix models, econometric models, development of investments, fixed capital.

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### Introduction

The first model reflects matrix modeling. The second model is an econometric model [1,2,3].

Currently, there is a rapid development of intelligent systems, intelligent concepts and technologies. Disciplines related to artificial intelligence systems appeared in connection with the trends of the educational process in the areas of practical activity related to solving problems of interpretation, diagnostics, monitoring, forecasting, planning, design, training, and management [3].

Artificial intelligence technology is based on the invention of computers or machines that are as intelligent as humans are. That is, intelligent programs and systems are developed as a result of studying a person's mental abilities.

Artificial intelligence is a machine that performs cognitive functions similar to human ones.

According to experts, the use of artificial intelligence helps to solve and improve the efficiency of complex tasks.

The use of artificial intelligence in the system of statistics, the solution of many different tasks is important both in practical processes and in research works.

Statistical methodology is a system of techniques, methods and methods aimed at studying quantitative patterns (repeatability and order of changes in phenomena) manifested in the structure, dynamics and interrelation of socio-economic phenomena. Statistical methods are used comprehensively (systematically).

This is due to the complexity of the process of economic and statistical research, consisting of four main stages:

- 1) collection of primary statistical information;
- 2) preliminary processing of primary information;
- 3) analysis and interpretation of statistical information;
- 4) modeling and forecasting.

At the first stage of statistical research, primary statistical material is collected; its reliability and completeness are checked. For this purpose, methods of continuous and non-continuous statistical observation are used.

At the second stage, preliminary data processing is performed, group and total totals are calculated, and some relative indicators are calculated. The main

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method used in this stage is the method of statistical groupings.

As a result of its implementation, a transition is being made from large arrays of statistical data to compact and convenient statistical groupings for analysis. At the third stage, statistical information is analyzed based on the calculation of generalizing statistical indicators: absolute, relative forecast values, variation, structure, relationships and dynamics. During the implementation of the fourth stage, the interrelations between socio-economic processes and phenomena are modeled; models are built that reflect the main trends in the dynamics of the studied indicators [2].

Today, in the statistical system, using agents as a direct attribute of artificial intelligence, neural networks, and in the near future quantum technologies, the above stages can be performed qualitatively and significantly accelerate the entire process of statistical calculations, and, consequently, the management of economic processes at all levels of government improvement and development.

The current stage of economic development is characterized by a deep integration of economics and mathematics. Currently, most of the scientific research in the field of economics is carried out using economic and mathematical modeling.

Modeling as a method of scientific research is particularly relevant for the economy.

Modeling is the replacement of the direct study of a system (for brevity, we will call it the original) by the study of another system, called the model of this original. At the same time, the behavior of the model should, one way or another, reflect the features of the behavior of the original. The meaning of modeling most often lies in the fact that the system model is simpler than the original one and its research is easier to carry out, but at the same time, it is cheaper. Sometimes (especially in nature and technology) direct study of the original for one reason or another is simply impossible, and modeling is the only way to get at least some information about it.

The main objectives of modeling in various situations:

1. Understanding and explaining the reasons behavior of the original.
2. Predicting the behavior of the original.
3. Development and design of technical systems or economic plans.
4. Automation of control of technical systems and devices.
5. Improvement (optimization) of the characteristics of the artificial system (technical or economic). The models that are created for this purpose are called optimizers.
6. Training (students, employees, etc.).

The application of mathematical methods in economic modeling is impossible without the use of computer technology. In particular, this applies to the

modeling of specific systems in the development of matrix or predictive models. The reason lies, first, in the extreme complexity of such systems, models of which must work with dozens, hundreds and even thousands of individual characteristics if practical statistical systems are meant.

Here, the use of artificial intelligence with appropriate algorithms and or trained neural networks significantly improves the entire process as a whole.

Let's take a closer look at the fourth stage from the statistical methodology on the following models:

1st model: "Designing a model of the Inter-Indicator Balance (IIB) of the digital economy in artificial intelligence for statistics and statistical research." (see on the next page).

In the model, seven indicators of the digital economy are selected as an example. And these are the following indicators:

1. Quantum technologies
2. Components of robotics and sensors
3. Neurotechnology and artificial intelligence
4. New production technologies
5. Distributed registry systems (blockchain)
6. Wireless communication technology (5G)
7. Virtual and augmented reality technologies

In theory and in practice, you can choose any significant (especially important, affecting other indicators) indicators, and in the Big Data system, artificial intelligence, all indicators at once. We built a matrix model identical in structure to the intersectional model and named it: Inter-Indicator Balance (IIB). This balance reflects the relationship of each indicator with other indicators of the digital economy [4,5].

If we consider the essence of each indicator in more detail, then we can make in-depth analyses of the interrelations of indicators with each other. This is important as indicators for statistics, as well as for research. In the matrix, for clarity, we have highlighted the quantum technology by row and column.

By highlighting quantum technology, we wanted to more accurately confirm the usefulness of such a model. It is especially effective if you build a more massive model structure, possibly including more indicators and using Big Data.

In modern literature, the usefulness of the relationship between quantum technology and artificial technology is indicated. We believe that such a connection also gives a longer life to all past technologies, possibly by connecting simpler or more complex agents, as well as if savvy specialists will find them places to use at the optimal place and at the right hour. Undoubtedly, this gives an additional economic effect and more than a positive ethical side of the issue. Thus, this example confirms that it is convenient to study statistical relationships between indicators as models.

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Indicators should be studied in the balance sheets in detail, both in kind, monetary, and percentage terms. Here we have given in the form of a matrix model, and it is also possible to present the model in the form of mathematical equations, solve optimization problems, etc [6-12].

The idea that such a model takes place can be said at least in an educational and methodological sense, but for financially supported structures, balance is very useful both in static form and in dynamics, which will probably be presented in subsequent articles.

Dynamic analysis is used for statistics, for scientific research, for specialists.

Here is the simplest example of a functioning museum, where anyone, regardless of age, can touch an adding machine, make calculations on it, consider a first-generation computer, etc. Well, if we consider more effective examples, then any technologies (including outdated ones) can be presented to all interested parties, whether they are students, specialists or scientific personnel through means of communication.

### Designing an Inter-Indicator Balance Model (IIB) \* of the digital economy in artificial intelligence for statistics and statistical research. \*\* (for 7 indicators)

Consumption Production	Quantum technologies	Components of robotics and sensors	3. Neuro-technologies and artificial intelligence	4. New production technologies	5. The system of the pre -shared registry (blockchain)	6. Technology without wired communication (5G)	7. Virtual and augmented reality technologies	The final production	GD P X <sup>p</sup>
Quantum technologies	X <sub>11</sub>	X <sub>12</sub>	X <sub>13</sub>	X <sub>14</sub>	X <sub>15</sub>	X <sub>16</sub>	X <sub>17</sub>	Y <sub>1</sub>	X <sub>1</sub>
Components of robotics and sensors	X <sub>21</sub>	X <sub>22</sub>	X <sub>23</sub>	X <sub>24</sub>	X <sub>25</sub>	X <sub>26</sub>	X <sub>27</sub>	Y <sub>2</sub>	X <sub>2</sub>
3. Neuro-technologies and artificial intelligence	X <sub>31</sub>	X <sub>32</sub>	X <sub>33</sub>	X <sub>34</sub>	X <sub>35</sub>	X <sub>36</sub>	X <sub>37</sub>	Y <sub>3</sub>	X <sub>3</sub>
4. New production technologies	X <sub>41</sub>	X <sub>42</sub>	X <sub>43</sub>	X <sub>44</sub>	X <sub>45</sub>	X <sub>46</sub>	X <sub>47</sub>	Y <sub>4</sub>	X <sub>4</sub>
5. The system of the pre -shared registry (blockchain)	X <sub>51</sub>	X <sub>52</sub>	X <sub>53</sub>	X <sub>54</sub>	X <sub>55</sub>	X <sub>56</sub>	X <sub>57</sub>	Y <sub>5</sub>	X <sub>5</sub>
6. Technology without wired communication (5G)	X <sub>61</sub>	X <sub>62</sub>	X <sub>63</sub>	X <sub>64</sub>	X <sub>65</sub>	X <sub>66</sub>	X <sub>67</sub>	Y <sub>6</sub>	X <sub>6</sub>
7. Virtual and augmented reality technologies	X <sub>71</sub>	X <sub>72</sub>	X <sub>73</sub>	X <sub>74</sub>	X <sub>75</sub>	X <sub>76</sub>	X <sub>77</sub>	Y <sub>7</sub>	X <sub>7</sub>
Remuneration of labor	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	V <sub>6</sub>	V <sub>7</sub>	V <sub>кон</sub>	
Netincome	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>	m <sub>кон</sub>	
GDPX <sup>p***</sup>	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	-	X

\*(IIB)- Indicator Balance (IIB) \* of the digital economy is named by the author.\*\*Compiled by: author: \*\*\*X<sub>p</sub> is the part (p-part, (Eng.)) of gross domestic product equal to the GDP of the digital economy, in the given model the sum of the GDP of seven indicators.

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The second model can also be considered as an object of using artificial intelligence in statistical calculations in practice and for research.

In the field of statistics, the use of modern methods of studying economic processes contributes to the successful solution of various tasks of economic activity. With the help of econometric models, it is possible to identify patterns and relationships, the application of scientific concepts, etc. Economic processes are constantly evolving.

Qualitative use of econometrics for modeling and quantitative analysis based on the use of economic statistics provides information support for the process

under study. Econometric modeling of indicators in statistical systems has its own, particularly important role, which can be taken into account when designing artificial intelligence in statistics. Let us consider the development of investments in the Republic of Uzbekistan (RUz) as the costs of creating, reconstructing (upgrading, updating) facilities, buying machinery, equipment, inventory, which can be produced both at the expense of own and at borrowed funds.

The analysis of the development of investments in fixed assets, as a percentage, is presented in the following table No. 1

**Table 1. Analysis of the development of investments in fixed assets**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021*
R.Uz	104,2	102,6	110,6	111,3	109,8	109,4	104,1	119,4	129,9	138,1	95,6	105,2

As we can see from the table over the past 10 years, investments in fixed assets have amounted to more than 100% percent annually. And only in 2022, when the pandemic had an impact on many countries, investments in fixed assets in the Republic of Uzbekistan (RUz) decreased to 95.6% percent.

Investments in fixed assets in the RUz influenced another important factor, which is the growth rate of gross domestic product by type of economic activity of the RUz. Consider this indicator in Table No. 2.

**Table 2. Growth rate of GDP by type of economic activity**

Year	GDP, total	Agriculture, forestry and fisheries	Industry	Construction	Services	Trade, accommodation and catering services	Transportation and storage, information and communication	Other service industries
2010	107.1	106.1	105.9	104.2	109.6	116.5	112.6	106.0
2011	107.5	106.1	104.4	108.1	110.0	115.7	111.2	107.7
2012	107.1	107.0	105.7	114.5	107.8	107.3	111.1	106.6
2013	107.3	106.4	107.5	118.4	106.8	113.8	103.4	106.0
2014	106.9	106.0	104.5	117.6	107.4	110.5	106.9	106.7
2015	107.2	106.1	105.3	118.8	107.6	111.3	106.1	107.0
2016	105.9	106.2	105.4	107.2	105.9	109.3	105.5	104.9
2017	104.4	101.2	105.2	106.0	106.0	102.1	111.3	105.3
2018	105.4	100.3	110.8	114.3	105.2	105.4	106.9	104.6
2019	105.7	103.1	105.0	122.9	106.0	107.2	106.6	105.4
2020	101.9	102.9	100.9	109.5	100.7	101.3	99.9	100.9
2021	107.4	104.0	108.7	106.8	109.2	113.0	117.2	105.9

Here you can also see the impact of the pandemic in 2020, all indicators for the growth rate of gross domestic product decreased slightly, in 2021, all indicators of GDP growth rates by types of economic activity of the Republic of Uzbekistan are mainly increasing.

However, in 2019, the indicator in construction was 122.9; in 2021, it decreased and was equal to 106.8. Perhaps this reflects the completion of any important construction projects or residential buildings and structures.

The indicator "Trade, accommodation and food services" has increased, as in the conditions of the

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pandemic; the population began to use the service sector more actively. The indicator for “Transportation and storage, information and communication has increased significantly.” It also

indicates that the population has become more active in using the opportunities of this sphere, literacy and skills in the field of information and communication have increased.

## References:

- (2017). *Trends in the development of the economy and industry in the conditions of digitalization*. Monograph Edited by Dr. of Economics, prof. A.V. Babkin, (p.135). St. Petersburg.
- Loginova, S. L. (2011). *GENERAL THEORY of statistics*. Textbook (economics and management). (p.230). Yekaterinburg.
- Gusarov, V. M., & Kuznetsova, E. I. (2007). *Statistics: a textbook for university students studying in economic specialties*. 2nd ed., (p.140). Moscow:UNITY-DANA.
- Gulamov, S.S. (2020). *"Digital Economy"*. (p.120). Tashkent.
- Gulamov, S.S., et al. (2023). “Indicators for assessing the development of the digital economy of the Republic of Uzbekistan”. *International Scientific Journal Theoretical and Applied Science*, Philadelphia USA No. 1(117).
- Pavlov, S. N. (2011). *Artificial intelligence systems: textbook*. stipend. In 2 parts. (p.176). Tomsk: El Content, 2011, Part 1.
- Terekhov, L.L. (1968). *Economic and mathematical methods*, (p.11). "Statistics".
- Akhmedova, S.H. (2022). *Economic systems and artificial intelligence*. International Scientific and Practical Conference “Theoretical and methodological aspects of improving statistical analysis of digital economy development” collection of scientific papers. (pp.45-50). Tashkent.
- Gulamov, S.S., Shermukhamedov, A.T., & Haitmatov, U.T. (2021). Methodological aspects of statistical analysis of the digital economy in Uzbekistan. *International Scientific Journal Theoretical & Applied Science*, Issue 03, Volume 95.
- Gulamov, S.S., Svirin, N.N., & Shermukhamedov, A.T. (2020). Crowdsourcing and “Internet of things” in the Republic of Uzbekistan. *“Theoretical & Applied Science”*. V.81, Issue 01, pp.176-180.
- Gulamov, S.S., Svirin, N.N., & Shermukhamedov, A.T. (2019). Digital logistics and blockchain -system- the basis on development of transport services. *J. “Theoretical and applied Science”*, volume 79, issue 11, pp.249-254.
- Gulamov, S.S., Shermukhamedov, A.T., & Ikramova, Yd.S. (2019). Creation “the clever city in the concept of digital economy. *American Scientific Journal*, N 31, pp.50-66.