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Prospects for Improvement of Statistical Observations Involving Promising Technologies

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Abstract

In the paper have been investigated prospects for improvement of statistical observations involving promising technologies. The purpose of the study consists in developing suggestions and recommendations for improving the processes of effective organization of the wide introduction of information and communication technologies in the activities of statistical bodies.

K*eywords:* *ICT; Effective Organization; Observations; Reports; Statistical Bodies; Statistics*

Introduction

Our research shows that digitization is a key factor in the further development of our national statistics and the further improvement of all its aspects. The daily increase in the demand of consumers for statistical information and the increase in the demand for quick information at the same time put new demands on the statistical system, and in this place, reducing the statistical burden of the respondents remains urgent. Until recent years, the statistics of our country were mainly focused on meeting the needs of state bodies. Nowadays, the demand of commercial, scientific and educational organizations, mass media and individuals for high-quality and detailed statistical information has increased dramatically. Therefore, the national statistical system of our republic will have to fundamentally change its approach to the processing and distribution of the resulting statistical information based on the above requirements. This should not be done at the expense of changing the periodicity of collecting statistical reports from respondents and placing excessive burdens on them.

In our opinion, meeting the new requirements of the state and society for statistical information with the wide use of digital technologies in a timely and qualitative manner will lead to an increase in the reputation of the statistical system. This is supported by the introduction of new methodologies, openness, the use of analytical methods, and the functional capabilities of digital technologies. In order to improve the quality of statistical information and reduce the amount of expenses, it will be necessary to use administrative resources and big data processing technologies.

Literature Review

Many well-known economic scientists and specialists of our country, as well as representatives of foreign scientific schools, who have conducted scientific research on the application of information and communication technologies in various branches and sectors of the national economy, can be cited.

Among them, it is important to note the scientists who dealt with the design and development of automated information systems of the company. The scientific and practical issues of the introduction of information and communication technologies into various branches of the national economy have been extensively studied in the scientific works of foreign economists. Among them, the work of K.S. Laudon [1], M.Banderman [2], P.Drucker [3], J.Rumbauf [4], A.V.Sheer, M.Hammer [5], D.Bell [6] and other scientists can be shown.

Currently, scientists from Uzbekistan V.Q. Qabulov, T.F. Bekmurodov, A.N. Aripov, S.S. Ghulomov, B.Yu. Khodiev, R.Kh. Alimov, B.A. Begalov, A.A. Musaliev, A. Abdug'affarov, A. Abduvakhidov, D.M. Rasulev, O.T. Kenjaboev,

Q. Alimov, R.A. Dadabaevas attached great importance to the issues of development of ICT and their wide implementation in national economic sectors and sectors.

However, as a result of getting acquainted with the scientific research of the above-mentioned scientists, the aspects of econometric modeling and statistical analysis of the processes of improvement and use of statistical bodies on the basis of information systems have not been fully studied. In particular, important aspects such as the methods of introducing information systems into the processes of receiving and processing statistical reports, the principles of econometric modeling of statistical activities based on automated information systems, the effectiveness of using automated information systems, their interrelationship, and development conditions have not been studied in depth scientifically and theoretically. This increases the relevance of the topic of this paper.

Analysis and Results

Currently, respondents have the right to submit their statistical reports in both electronic and paper form. The reason for the appearance of errors in primary statistical data is the lack of arithmetic-logical control at the stage of their formation in paper form. They usually identify existing errors in the process of computer filling of statistical reports based on accounting documents. Therefore, electronic submission of statistical reports by respondents reduces budget costs and improves the quality of primary statistical data. In order to improve the accuracy of statistical reports, instructions to respondents on each report form should be developed and placed at each level of the e-stat 4.0 information system.

Our research shows that most statistical reporting respondents have fully automated their primary and analytical accounting by now. Based on the primary accounting documents of the respondent's production, economic and financial activities, the development and wide implementation of the algorithm for the formation of statistical reports allows the statistical authorities to automate the processes of forming primary statistical data and filling out statistical reports.

It is worth noting that, instead of manually filling in statistical reports by respondents through the e-stat 4.0 information system, automated reporting based on primary accounting documents not only increases the reliability of primary statistical data, but also reduces respondents' costs in providing statistical reports.

Digitization of statistical data submission processes will significantly increase the completeness and reliability of statistical reports, reduce the time of collecting statistical reports and processing primary statistical data, including:

- It will be possible to shorten the terms of submission of monthly, quarterly and annual state statistical reports by 4-5 times due to the automation of primary accounting and the automatic formation of statistical reports based on it;
- Creates a basis for reducing the processes of processing the primary statistical data and forming official statistical information by 2-3 times;
- Due to mutual integration of the e-stat 4.0 information system with similar information systems of other ministries and agencies, it will be possible to automatically generate some indicators in statistical reports.

Practice shows that the collection of statistical reports requires respondents to incur expenses related to the preparation of primary statistical data and filling in the form of selective statistical observations. According to our expert evaluations, only during the annual reporting period, the respondents spend 2.5-3.1 bln. They spent around soums. The widespread introduction of digital technologies into these processes is leading to a radical reduction of these costs. Forming statistical reports on the basis of digital technologies, online sending and receiving, and full automation of processing processes provide the following factors of economic efficiency:

- High speed of traditional operations due to high speed of digital technologies;
- Improvement of the quality of statistical work due to the establishment of a single statistical database and its multiple use;
- Improvement of information service to various links of the statistical system due to shortening of the period of submission and receipt of statistical reports.

In our opinion, one of the promising ways to reduce the burden of respondents related to the submission of statistical reports is to obtain primary data from alternative sources and make maximum use of them. Therefore, on 10.11.22, the Decision of the President of the Republic of Uzbekistan No. 419 on "Measures to optimize the procedures for submitting reports and keeping archival documents" was adopted. With this decision, 9 statistical reports have been canceled, and the practice of forming the statistical data provided in these reports based on the administrative data of relevant ministries and agencies is being started. In addition, the task of optimizing statistical reports by mutual integration of the databases of ministries and agencies is also set.

Our research shows that the international statistical community is developing modern approaches to the modernization of statistical production processes based on digital technologies. GSBPM (Generic Statistical Business Process Model), a sample model of statistical information production developed by the UN Department of Statistics and gradually being introduced, is used by many national statistical bodies in their practice. DSQ is also effectively conducting the processes of applying this GSBPM model, which includes the following stages:

- Determining the demand for official statistics. Nowadays, the requirements of the state bodies are determined in advance by DSQ, and annual statistical programs are developed based on them. In our opinion, the requirements of the private sector, individual entrepreneurs, researchers and other users are also required to be closely studied. Selling the final statistical information to them on a commercial basis serves as a good basis for additional financial resources;
- Planning of statistical production processes. It will be necessary to determine the structure and content of statistical work on each branch, to determine the periodicity of reports, to create methodological bases for general and selective observations;
- Preparation of statistics production processes. In this case, it is necessary to develop the methods of forming official statistical information, to form an economic description of statistical work, to

develop data collection and processing instruments, to convey the capabilities of the instruments to the respondents;

- To collect the necessary information for the purpose of performing each work included in the statistical program. Work is organized on the basis of statistical reports received from available statistical information resources and respondents;
- Processing of primary statistical data collected with wide use of digital technologies and formation of official statistical information;
- Dissemination of developed official statistical information. 6 thematic sites of the statistical system, the integrated information system and other channels are being used to distribute the resulting statistical information;
- Assessment of the quality of official statistical information. In this direction, questionnaires are periodically conducted among the respondents through the official website of the committee.

As mentioned above, the assessment of the quality of statistical information is one of the most serious factors in the future. Therefore, a promising technological model of e-stat 4.0 information system operation is proposed below (Fig.1). In this technological model, a framework for controlling and managing the quality of statistical information is proposed. Its main task is to check the data of incoming documents, requests and statistical reports through the e-stat 4.0 information system on the basis of several technological operations (TO), and if there are any errors in them, they are eliminated.

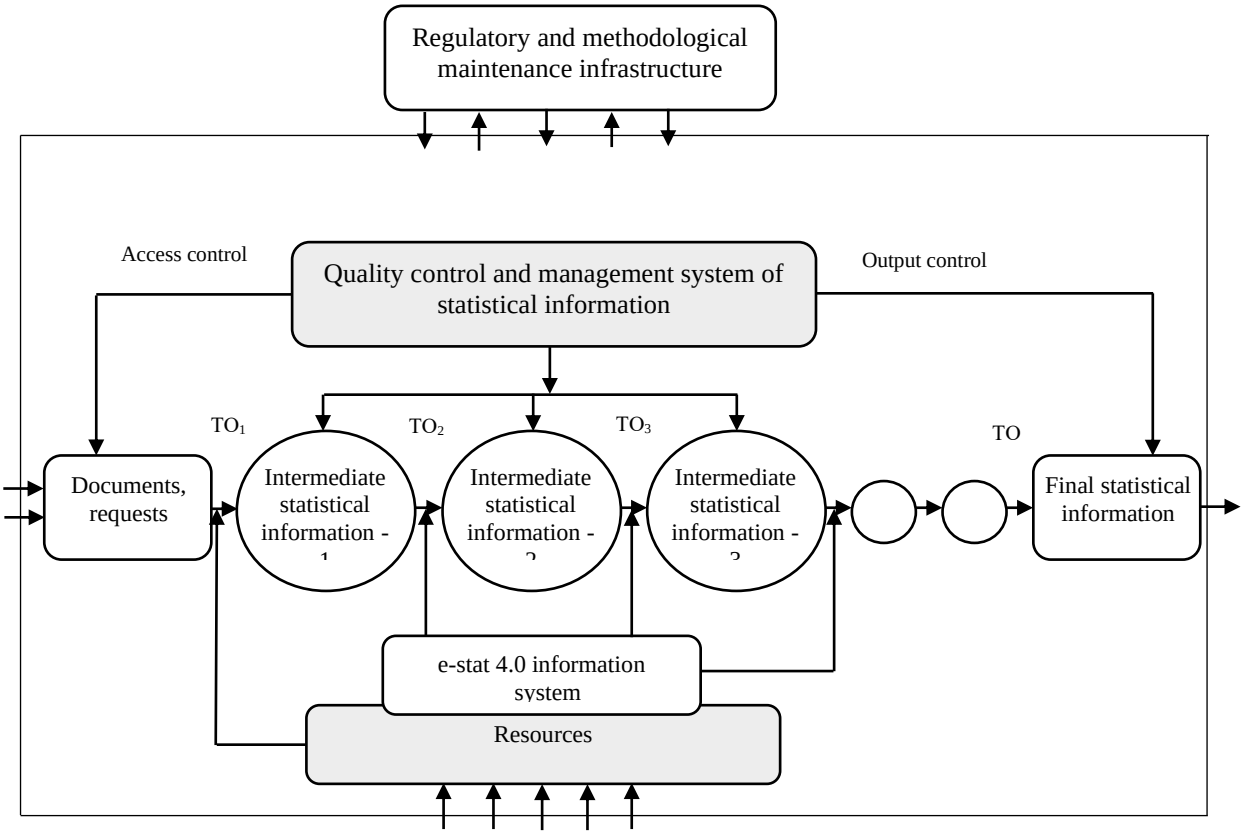

Figure 1. A promising technological model of e-stat 4.0 information system operation

It is known that the employees working in the statistical bodies receive their salaries mainly from budget funds. However, in addition to this, there is a possibility to apply fines to entities that do not submit statistical reports in the specified period and order, to increase the salaries of employees based on

the financial funds that go to the account of providing consulting services by selling the resulting statistical information to users. That is why it is necessary to use modern marketing tools widely. Our research shows that one of the main trends in marketing communications today is their integration with digital technologies. Consumers often interact with statistical information resources and various forms of charts, graphs and cartograms, and do not have direct contact with statistical authorities.

Statistical information is offered to users through interactive services, that is, through websites and electronic stores. If they are available through the website of the committee, then they are provided to the users free of charge, otherwise they are delivered to the users after placing an order and paying for it online through the electronic store (ED). Thus, the quality of the interactive interface created by the committee determines the satisfaction of users. Taking into account the above, we have developed the technology of providing statistical information to consumers in the environment of the digital economy through research (Fig.2).

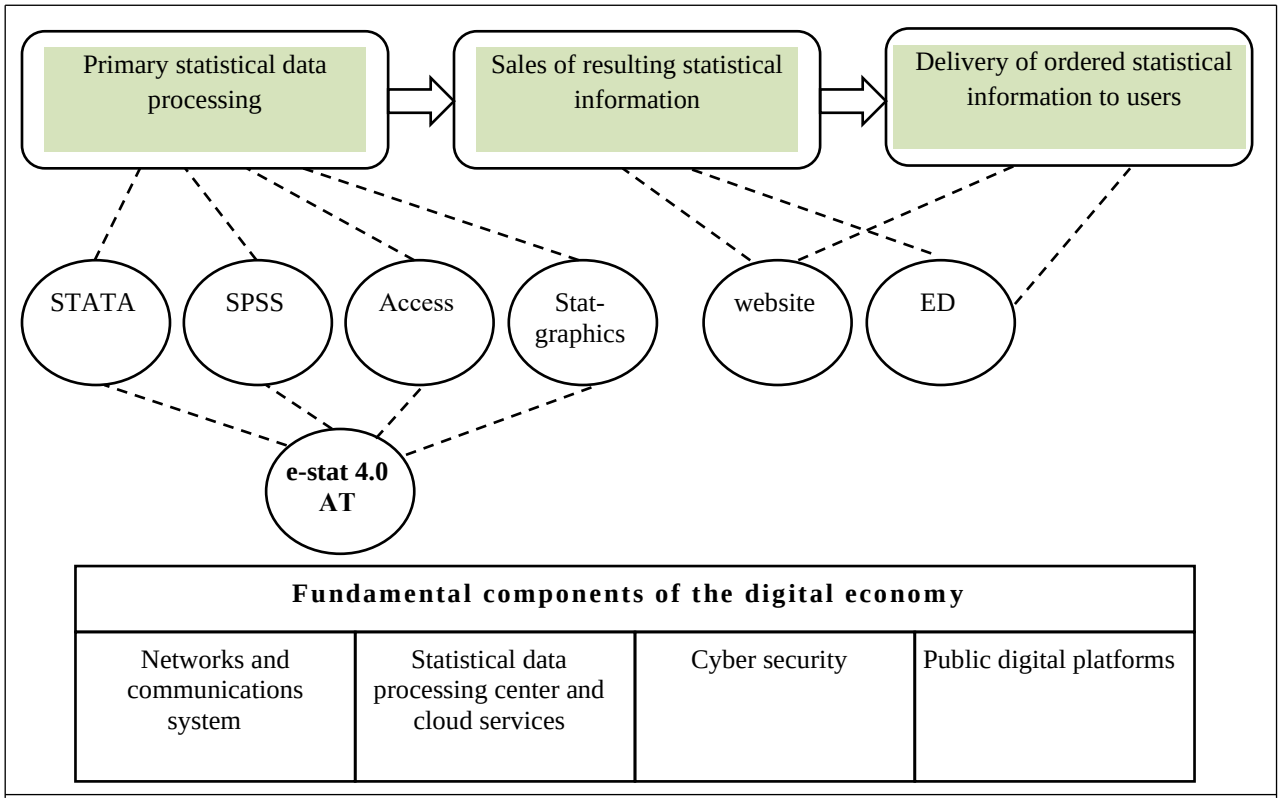

Figure 2. The technology of providing statistical information to consumers in the environment of digital economy

On the basis of the technology proposed above, it is necessary to strengthen the analytical functions of the statistical bodies in establishing mutually beneficial relations with the users. Due to the fact that the majority of end users are small business entities and individual entrepreneurs, their demand for not only final statistical information increases, but also the demand for analytical data in various directions based on them is natural. Therefore, in the coming years, it will be necessary to study the functional capabilities of special application packages for processing primary statistical data collected through the e-stat 4.0 information system and to prepare analytical reports based on them, and to use their tools effectively in their practice. As a result, the demand for commercialized statistical information and analytical data is constantly increasing.

In our opinion, based on the above suggestions, the state interactive services provided by statistical authorities should be focused on:

- Increasing the speed and efficiency of the functions performed due to the increase in the speed of distribution and mutual exchange of statistical information;
- To strengthen control over the timely execution of requests and orders received by legal entities and individuals;
- Expansion of mutual statistical information exchange with users based on the wide penetration of digital technologies into our lives and the functional opportunities they provide.

In our opinion, the main goal of the wide application of digital technologies in the process of collecting statistical reports, conducting sample statistical observations and other statistical activities is to organize the effective management of statistical information of various types. Statistical bodies should create conditions based on digital technologies, in which users in management bodies, business, science, public organizations, mass media and the population should get a full orientation in the digital space, and logically understand how to work on statistical data and use them. they should use effectively in their practices. It is worth noting that the formation of a statistical data management system based on digital technologies is a complex and time-consuming process, which cannot be accomplished only by the implementation of organizational and technical measures. Digital technologies make it possible to quickly satisfy a wide range of information requests, and the most important thing is to use them correctly. Currently, the formation of intelligent statistics is not only becoming more urgent, but also requires the implementation of concrete measures to reform the national statistics system with the wide introduction of digital technologies. At the same time, I must not forget the following when implementing the above:

- It is not necessary to approach the formation of the statistical data management system as a formality. Each activity to be implemented must have clear intermediate and final results;
- It is not necessary to completely destroy the system that has been working efficiently for years in statistics, that is, new approaches and mechanisms, digital technologies should be integrated with the previous ones and serve to further improve them;
- Relying on the fundamental foundations and methodology of statistics, the national statistical system should integrate with other sources of statistical data in the conditions of continuous provision of the full satisfaction of the demand for statistical information of state administration bodies and private business entities.

Our research shows that it is necessary to further expand the functional capabilities of the e-stat 4.0 information system based on digital technologies, because the economic entities that use it are also using the latest technologies in their activities. For this, it is necessary to be able to assess the current quality indicators of the e-stat 4.0 information system and to know in advance which aspects should be improved based on them in the future. Based on this, we offer a composition of promising methods and tools for ensuring the quality of the e-stat 4.0 information system (Fig. 3.8). It can be seen that the methods of ensuring the quality of this information system include the standards of ensuring the quality of the system during its life cycle, the use of regulated technologies and approaches to testing and final control of the finished information software product. As an object of control in system quality assessment and continuous improvement, it covers the entire set of documents necessary for the full operation of the information system and the technologies of ensuring the life cycle of the information system. At-testing, inspection of each of its blocks, standardization of reporting steps and processes, and certification of the quality of the software product are envisaged as the main tools for assessing the quality of the e-stat 4.0 ax-borot system. In addition, in the assessment of the quality of the e-stat 4.0 information system, its functional capabilities, level of reliability in receiving and processing reports, ease of use, aspects of economic efficiency, aspects of software product repair and its mobility are also covered.

SDMX is an international initiative aimed at standardization and modernization of statistical data and metadata exchange mechanisms and processes between international organizations and their member countries. Metadata in SDMX is divided into two groups:

- Structural metadata - a set of concepts used to describe and identify statistical data and metadata;
- Data metadata is a large set of concepts that define and qualify data sets and describe the entire data set or even the entity providing the data, usually not an observation or data scenario. Link metadata is usually in text or HTML format and uses concepts that describe the content, methodology, and quality of the data.

In SDMX, data is distributed in Excel, PDF, CSV, JSON, and XML formats, including metadata. Metadata is used to provide information describing statistical data and processes in a standardized way by providing users with information about the sources, methodologies, definitions, classifications and quality of data.

The correct implementation of the metadata system is the main factor for users to understand the statistical information provided by the statistical authorities, creating many conveniences.

Based on the technology of providing statistical information to consumers in the environment of the digital economy (Figure 3).

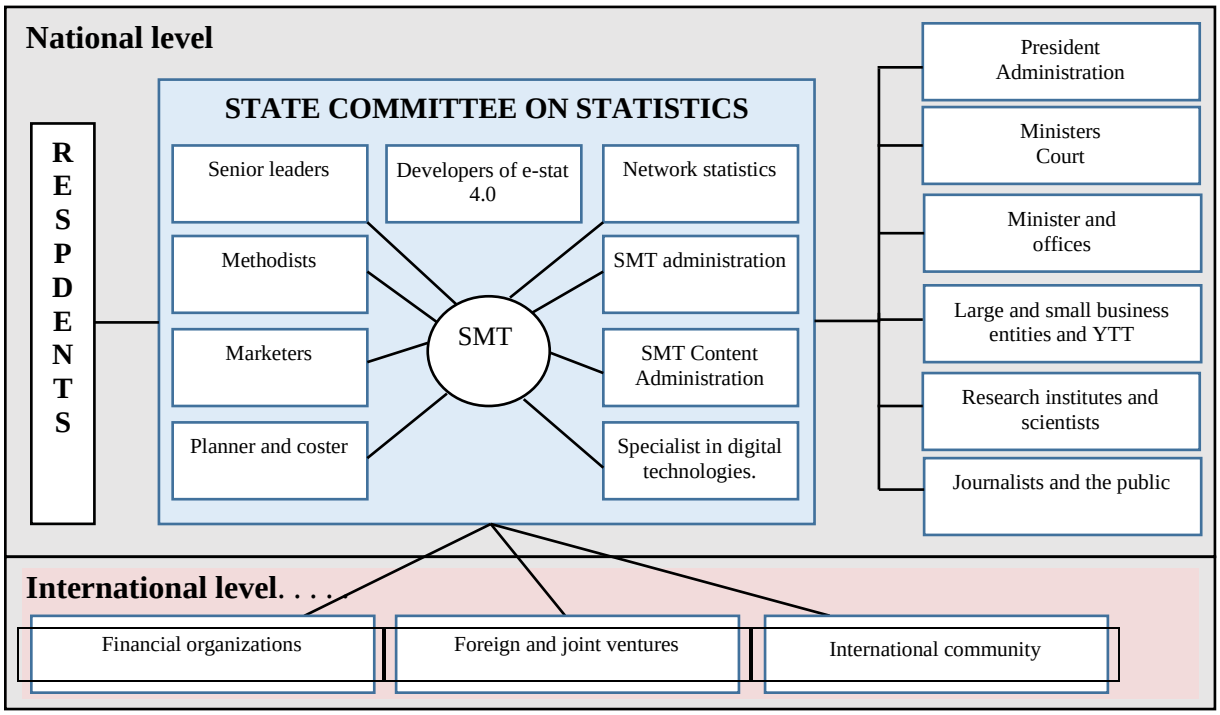

Figure 3. Organization of statistical metadata system and content of their users

Our research shows that certain objective problems arise in the commercial delivery of statistical information to users, formed on the basis of primary statistical data collected from thousands of economic entities through the e-stat 4.0 information system. The most important of them is the fact that these resulting statistical information are embodied in various network administrations and that they are not always accessible online. Therefore, as a logical continuation of the practical implementation of the

scientific approaches proposed above, it is necessary to develop a commercialized automated bank of statistical information (SATAB) and actively maintain it.

The technology of operation of SATAB in the conditions of wide introduction of digital technologies in statistical activities is presented in the following figure 3.10. The information fund of SATAB should consist only of the factual base of statistical information, which reflects the dynamic series of statistical indicators reflecting the trends of socio-economic development of our republic. In the part of its database of documents, it is necessary to include a series of methods of forming analytical statistical materials and indicators in various branches and sectors of our national economy. Each statistical database is divided into sections, rubrics and rubrics. It is worth noting that in order for users to move easily through the database and to improve it step by step, its content should be consistent with the country's system of socio-economic development indicators.

Conclusions

Based on the above principles, in SATAB, the following structure of the dynamic array can be used, that is, it can be separated by name, periodicity, region and other characters. As it can be seen from the proposed technology, the high level of satisfaction of the users' demand for statistical information depends on such factors as the means of providing them, the user interface, and how fast the SATAB administration works. Currently, the settlement with users for the statistical information they have purchased is done online, and customers do not need to visit the statistical offices in person. It is also worth noting that when working online, the user may make selections for important words or lists in the SATAB environment. Here, the user interface means not only communication through a computer, but also the interfaces of communication through electronic tablets, iPhones, laptops, netbooks, iPads, and other devices that have become a part of every user's life.

Until now, interactive services provided by statistical authorities are not fully automated. It should also be noted that the indicators of socio-economic development of our republic are prepared manually and published in the form of tables on the official website. In this regard, the role of the electronic store offered above is great, and it is one of the promising directions to satisfy the users' demand for statistical information in an automated way. The rapid development of digital technologies and the wide penetration of all aspects of our life create a good basis for further improvement of interactive services provided by statistical offices.

Our research shows that the needs of users cannot be fully satisfied only through the committee's official website and electronic store. In addition, not all users have the skills and economic knowledge to understand and analyze large amounts of statistical data and create the necessary graphs. Based on this, a statistical integrated information system based on digital technologies (SIAT, electronic address: www.siat.stat.uz) was designed, developed and is gradually being put into practice by DSQ. After this system is fully operational, it will be possible for users of different categories to get the statistical information they need in the directions they are interested in.

As a result of wide application of SIAT in practice, it will be possible to achieve the following results:

- Incorporates modern and effective methods of distribution of resulting statistical information;
- Provides the general public with simple understanding of statistical information, including for persons who do not have special knowledge in the field of statistical analysis and economics;
- Provides rapid distribution of statistical information in the form of graphs, charts and cartograms;
- It is possible to obtain dynamic series for at least the last 10 years in the cross-section of the republic's territories and at the level of the districts of the region, and their graphical analysis is also presented;

- Based on graphs, charts and cartograms based on dynamic lines, it becomes easier for managers to make quick management decisions.

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