PROSPECTS FOR THE OPTIMAL DESIGN AND EFFECTIVE USE OF INFORMATION SUPPORT OF STATISTICAL INFORMATION SYSTEMS OF ENTERPRISES

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Abstract: This article analyzes the ways of optimal design and effective use of information supply of statistical information systems in the economy. The main indicators characterizing the production and economic activity of the district statistical departments of Tashkent were studied, conclusions and recommendations were developed.

Key words: economics, statistics, information system, management, efficient, optimal, project, technology, production.

The organization and operation of information systems in the management of the economy is associated with the development of information technology - a key component of the automated information system (AIS). Automated Information Technology - collects, registers, transmits, collects, retrieves, processes and protects information based on advanced software, computing and communication tools used to solve management tasks, as well as methods of presenting information to customers. is a systematically organized set of enhancement methods and tools. Technology in the broadest sense is understood as the science of the production of material wealth, which includes three types: information, hardware and social perspectives. The informative point of view describes the principles and methods of production, the tools of labor, which are carried out with the help of equipment and production, social workers and their organization. In the narrow sense of industry, technology means the sequence of actions taken on the subject of labor in order to obtain the final product.

The concept of information technology emerged in the last decade of the twentieth century in the Continuation of the emergence of informatics. Information technology emerged as a science of information processing as information began to

be considered as a resource for production as a whole, along with other material resources. Moreover, the production of information and their high level of knowledge has a decisive impact on the modernization and creation of new industrial technologies.

By the 1990s, with the advent of personal computers in our wider lives and their declining cost, functional opportunities for per-sonal calculations have been created, and the transition to centralized technology for collecting and processing statistical information has become possible. In the new centralized model, the following functions have been attached to the district and city statistics departments (Figure 1):

- administration (involvement of objects to statistical observers, providing them with the necessary tools);
- collection of primary statistical data on paper forms;
- Enter and control primary statistics in the computer database;
- sending primary information from regional statistical bodies by e-mail and other means.

The transition to a centralized scheme of statistical data processing with the distribution of functions at the district, regional and national levels will significantly increase the efficiency of collection and processing of primary statistical information in regional statistical agencies on the basis of ICT. The content of the innovations in it is that the process of collecting statistical information goes beyond a specific form of statistical observations and is organized at the regional level as an independent system of SIS. In order to effectively implement this scheme in practice, it is necessary to change the organizational and technological work of the regional statistical bodies.

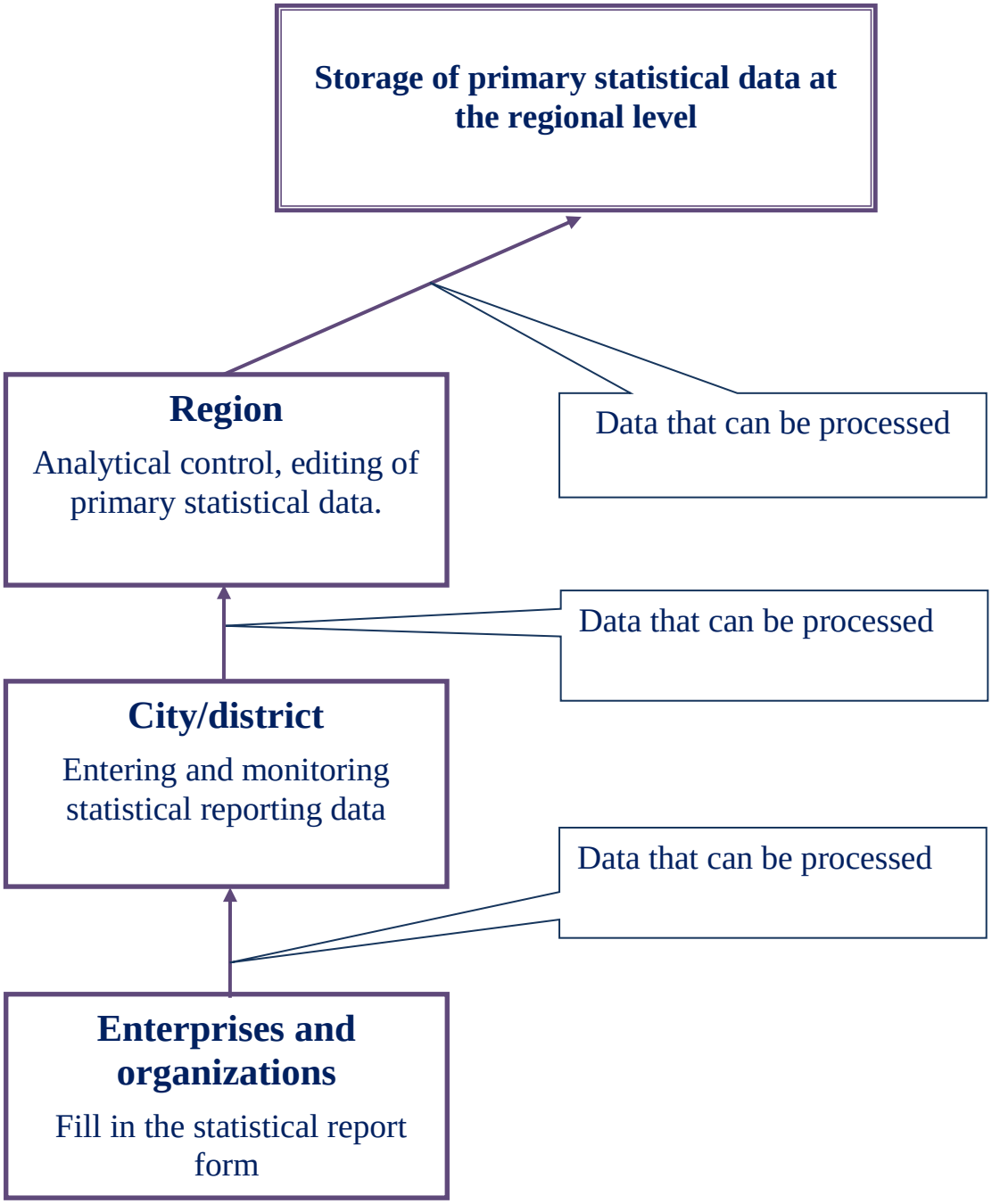


Figure 1. Scheme of centralized collection of statistical data[1].

[1] Developed by the author as a result of research.

Experience has shown that at the SIS level, national and local classifiers are used to classify and encode information. The practical application of national classifiers is an integral part of the system of classification of social and technical and economic information, ensuring the interconnectedness of statistical issues addressed at the district level within the SIS with issues at the highest level of the statistical system.

When it is not advisable to apply these classifiers in practice, local classifiers are used, which are mainly aimed at solving specific problems. Nowadays, due to the transition to a market economy, there is a need to use mobile classifiers in conjunction with their international counterparts.

At the district level of the SIS, information arrays are an integral part of the information supply, which is maintained on the basis of primary statistical reporting forms. Arrays of conditional-permanent information are usually generated once a year, and the necessary edits are made when changes occur. Arrays of variable information are formed on the basis of data in the form of primary statistical reports on the solution of each statistical problem. It should be noted that in practice, intermediate statistical data arrays are also formed, which are destroyed after solving one or another statistical problem or used to solve other problems.

A local statistical database will be formed as part of a high-level database due to the use of integrated technologies during SIS activities. They contain generalized data that can assess the socio-economic development of the district, as well as provide specific data on various objects of statistical observations. The integrated processing of statistical data requires that the local database at the district level have a standard structure and be technically, informationally and programmatically compatible with the databases of the higher level of the statistical system. As a result, a single corporate information network for solving statistical problems in the country will be formed.

It should be noted that the structure of the local database at the district level includes input and output statistics, various analytical data acquisition algorithms,

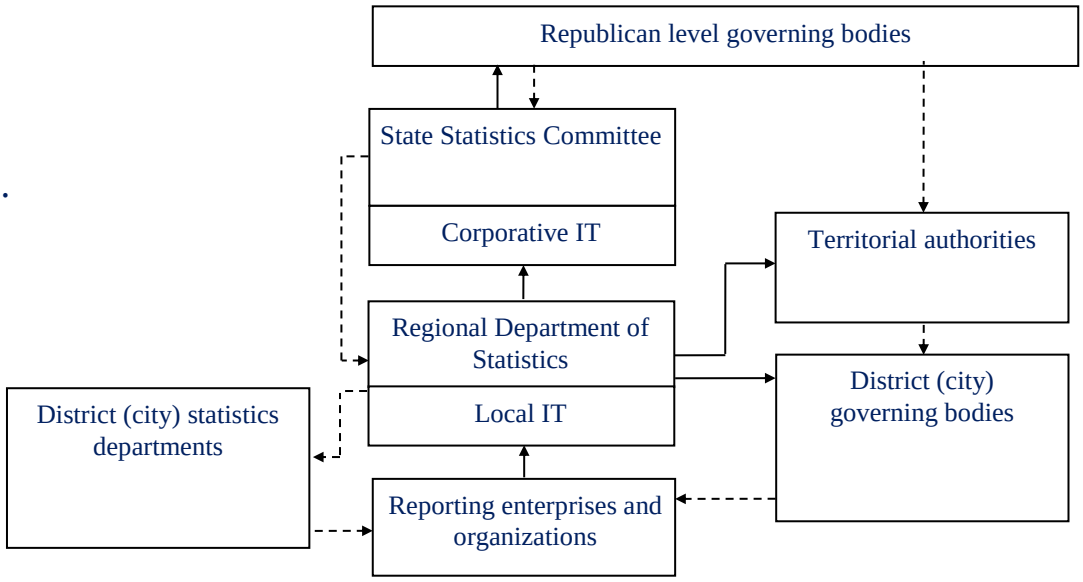
and more. The functioning of the local database of statistics is based on the principle of uniqueness of information, limits the return of data, requires multiple use of data on the basis of a single entry in the memory of the computer. Thus, the use of a local database and the IDB, organized on the basis of the principles of integrated processing of statistical information at the district level, meets modern requirements for the storage and access to statistical data. However, we can observe that such ideal conditions do not exist in all district statistics departments.

The statistical information generated in the reporting enterprises and organizations and received by the state statistical bodies for further processing serves as the basis for the preparation of compilation-analytical materials, statistical bulletins, reports, reports and other statistical materials. This output information is widely used in management decision-making, development of targeted programs, forecasting of social and economic processes, informing the population. They are users of various types of governing bodies, including enterprises, organizations and individuals. In addition, this information is widely used by statistical agencies to improve the statistical methodology in accordance with the needs of society, the introduction of new forms of statistical reporting, the maintenance of new statistical indicators.

In order to provide all categories of consumers with quality statistical information in a timely manner, it is necessary to achieve their rational placement at the intersection of processing centers, in which the SIS is the district and provincial level. In the context of reforming statistical information systems at the district statistical level, the solution of this problem becomes even more urgent. At present, as a result of providing the district statistical offices with modern equipment and highly qualified specialists, it is possible to process a large volume of primary statistical reports. As a result, the district statistical offices have created conditions for the processing of primary statistical reports, which were previously submitted to a higher authority. In addition, in the context of reforming the statistical agencies, it is proposed to process the primary statistical reports at the regional level at the district level. Therefore, in our opinion, it is necessary to

organize statistical information on the basis of the criteria of rational distribution of their processing centers at the "district-regional" level. However, before applying this proposed criterion, let us consider the flow of information circulating in the “district-region” system. Figure 2 below shows a diagram of the main information flows circulating at the “district-regional” level, which shows the three main flows.

1.



2 and 3.

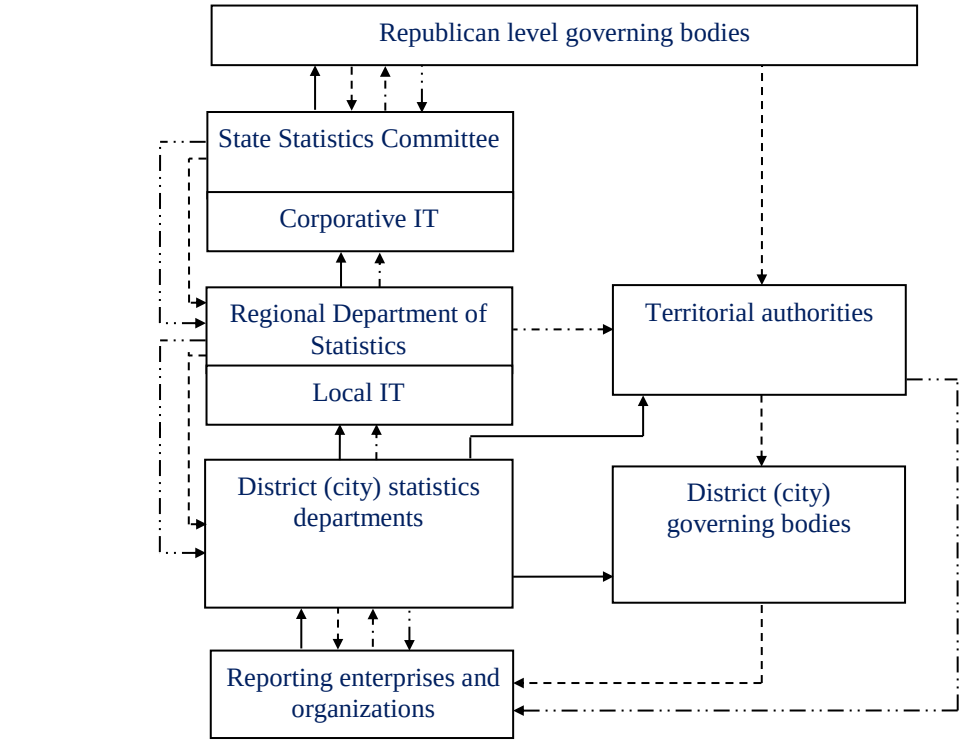


Figure 2. Schemes of the main information flows circulating at the "district-regional" level [2].

As a result of the reversal of statistical information flows through all levels of statistical bodies, there are guidelines for further improvement of the statistical methodology adopted in the SSC. These guidelines are developed on the basis of management decisions made as a result of the analysis of the correct flow of statistical data adopted by the governing bodies.

As a result, statistical authorities provide information to reporting enterprises and organizations, which reflects changes in the formation of primary statistical reports approved by the STC.

Output data from the processing of primary statistical information are sent mainly to the regional statistics department in the form of summary reports, and output analytical materials in the form of reports and bulletins are sent to district and regional administrations. The second reverse flow of statistical information will be similar to the first reverse flow.

The third stream of statistical information flow is as follows. Forms of primary statistical reports are mainly collected by district statistical offices through an automated information system, in which only the primary, ie sorting, grouping, selection and processing, is carried out. The main processing processes related to obtaining the resulting data are carried out in the regional statistics department. Some of this data is transmitted in aggregate form to the SIS level of the republic, while the other part is transmitted to the regional authorities in the form of various analytical materials. The third reverse flow of information differs from the previous ones in that it receives assignments and recommendations directly from enterprises and organizations by territorial administrations.

In the information flows discussed above, the following can be observed that are common, the uniformity of the number of organizations, the uniformity of the source of statistics and users, the two types of flows - direct and inverse. In

[2] Developed by the author as a result of research.

addition, at the level of district and regional statistical agencies, the technological processes of statistical information processing in the SIS are carried out in the same scheme, which uses standard information and software, as well as ICT. Based on the above, the issue of distribution of information flows in the regions is less complicated and does not require significant changes in the system of statistical data processing.

The above issue must meet the criteria of rationality, because the goal of all measures to improve the functioning of the statistical information system is to provide users with quality statistics in the short term. In the absence of capital inflows, the criteria for the rational use of SIS in the period of reform to further improve and develop their activities serve the purpose of minimizing the total cost of processing statistical information.

Our research shows that the problem of rational distribution of information flows at the regional level can be solved only if the following conditions are met: and the possibility of sequential processing of quantities, the demand for the processing of statistical information can not exceed the technical capacity of statistical organizations.

During our research, a methodology was developed, taking into account the possibility and necessity of solving the problem of distribution of statistical information on the example of the Statistics Department of Tashkent, as well as taking into account the above conditions of their implementation.

The basis of the proposed methodology is to minimize the cost of processing all statistical data circulating in the city statistical office during the year. This methodology also takes into account the periods of maximum burden on the SIS and ICT used in practice, and for the processing of some statistical data from the districts to the city of Tashkent and vice versa. Thus, it will be possible to redistribute information flows at the district and city SIS levels, depending on the need for production. As a result of the redistribution of large burdens on statistical organizations SIS and ICT, the resulting statistical information is closer to consumers, in the example of which we see the district and city administrations.

Thus, the time for providing statistical materials to users is reduced, and as a result, the speed of management decision-making is further increased.

In the example we are considering, this option is as follows. We assume that the flow of statistical information and their processing centers are known to us. The statistical data should be distributed among the processing centers in such a way that the total amount of processing value of all forms of primary statistical reports circulating at the "district-city" level during the year should be kept to a minimum.

This econometric model looks like this:

$$F = min \sum_{i=1}^{I} \sum_{j=1}^{J} [C_0 Y_{ij} + C_i(1 - Y_{ij})] V_{ij}$$

(2.6.)

with the following restrictions:

$$[W_0 Y_{ij} + W_i(1 - Y_{ij})](t_i^K - t_j^H) \geq V_{ij}, \qquad i = \overline{1,\mathrm{I}};\ \mathrm{j} = \overline{1,\mathrm{J}}$$

$$\sum_{k=1}^{j} \sum_{i=1}^{I} V_{ki} Y_{ki} \leq W_0(t_j^K - t_1^H) \qquad \mathrm{j} = \overline{2,\mathrm{J}}$$

$$\sum_{k=1}^{j} V\,(1 - Y_{ik}) \leq W_i(t_j^K - t_1^H) \quad i = \overline{1,\mathrm{I}}; \quad \mathrm{j} = \overline{2,\mathrm{J}}$$

$$Y_{ij} = \begin{cases} 1 \\ 0 \end{cases} \qquad i = \overline{1,\mathrm{I}}; \quad \mathrm{j} = \overline{1,\mathrm{J}}$$

In where:

F – the objective function of the model;

i – Number of districts in Tashkent;

j – Number of statistical reporting forms circulating between statistical bodies at the SIS district and city levels;

C_0 – the average cost of processing a unit of statistical information in the city statistics department (1 thousand characters);

C_i – i- the average cost of processing a unit of statistical information in the district statistics department (1 thousand characters);

V_{ij} – i- the total amount of information obtained from the j-digit statistical forms in the district statistics department;

W_0 – average productivity of existing technical means in the city statistics department (thousand characters / unit of time);

W_i – i- average productivity of available technical means in the district statistics department (thousand characters / unit of time);

t_j^H – time (moment) of receipt of the j-statistical report form to the statistical organization;

t_j^K – timely submission of final information on the form of j-statistical report by the statistical organization;

Y_{ij} - (bul) variable models, if all statistical reports on j-form in i-district are processed in the city statistical office, the variable model is equal to 1, if all statistical reports on j-form are processed in the district statistical department, this value is equal to 0 is obtained.

In general, problems are variable linear programming problems, and to solve this or that limit or network computational schema method can be used. In the simple analytical form, which is a target function, It reflects the sum of the values of the processing of all state statistical forms during the year. The first group of constraints Represents the timely processing of the j-state statistical form for the i-district (city) ($[tj^H, tj^K]$ over time). The second group of restrictions allows the regional statistical offices to verify that 1,2, ... j, state statistical reporting forms are processed sequentially from all districts within the timeframes strictly defined for each form. The third group of restrictions allows the district statistical departments to verify that the state statistical reporting forms 1,2, ... j, are processed

sequentially from the reporting organizations from the i-district within a fixed period for each form. The fourth group of constraints defines the range of change of controlled variables, ie if the optimal solution is Yy = 1, then all statistical reports on the state statistical reporting form for district i will be processed in the regional statistical office, if Yy = 0, i All statistical reports on the j state statistical reporting form for the district are processed in the statistical department of this district.

The methodology of rational distribution of statistical information flows by their processing centers is based on the criteria for minimizing the cost of processing all state statistical reports in Tashkent during the year. Today, this criterion is very relevant in connection with the reform of statistical activities. Based on this approach, it is possible to assess the prospects of the statistical departments of a particular district, to lay the groundwork for making informed conclusions on the direction in which they will be developed.

This methodology allows to analyze the information flows generated in the district or city statistics departments and, as a result, to use the optimization models to select the best option for the management of state statistics bodies in the context of limited resources. Initially, this methodology involved a comprehensive observation of the flow of information circulating in the city, and also carried out their analysis.

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