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ОРИГИНАЛЬНАЯ СТАТЬЯ

АНАЛИЗ ПРОЦЕССОВ ПОДГОТОВКИ К ЭКСПЛУАТАЦИИ ЦИФРОВЫХ ИНСТРУМЕНТОВ В РАМКАХ МУНИЦИПАЛЬНОГО-РЕГИОНАЛЬНОГО ВЗАИМОДЕЙСТВИЯ

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Аннотация. Изменения в технологической базе публичного управления оказывают существенное влияние на социально-экономические процессы, реализующиеся на различных уровнях – от регионального до международного. Высокое значение при этом приобретает муниципально-региональное взаимодействие в сфере внедрения и использования цифровых инструментов реализации публичного управления. Однако данный процесс является в высокой степени неформализованным, прежде всего – относительно стадии внедрения данных инструментов в опытную и производственную эксплуатацию. Данный фактор обуславливает актуальность определения наиболее существенных аспектов процесса внедрения цифрового инструмента в сфере публичного управления, как необходимой составляющей его формализации и перехода к использованию количественного расчёта эффективности мероприятий по цифровизации сферы публичного управления. Целью настоящего исследования является анализ процессов подготовки к эксплуатации цифровых инструментов муниципальных организаций в условиях муниципально-регионального взаимодействия. На основе поставленной цели в рамках исследования определён ряд задач, включающий в себя анализ нормативного закрепления цифрового инструмента, технико-технологических и кадровых факторов его внедрения. Основой исследования стали нормативно-правовые акты органов публичной власти, официальные цифровые публикации государственных и муниципальных организаций, научные публикации по вопросам цифровизации государственного управления. В рамках исследования на основе анализа процессов подготовки к эксплуатации цифровых инструментов был выявлен комплекс факторов, оказывающих ключевое воздействие на эффективность внедрения цифрового инструмента. В соответствии с проведённой группировкой рассмотрены кадровые, инфраструктурные, программные, аппаратные и организационные факторы, а также их взаимодействие. Рассмотрен процесс нормативного закрепления использования инновационного цифрового инструмента публичного управления, а также выделены необходимые требования к его оптимизации.
Ключевые слова: инновации, информационные технологии; местное самоуправление, модели, региональное управление, цифровые технологии

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ORIGINAL PAPER

ANALYSIS OF THE PROCESSES OF PREPARING FOR THE DIGITAL TOOLS OPERATION IN THE FRAMEWORK OF MUNICIPAL-REGIONAL COOPERATION

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Abstract. Changes in the technological basis of public administration have a significant impact on socio-economic processes, implemented at different levels – from regional to international. Municipal-regional interaction in the field of digital tools implementation and use for the public administration implementation is of high importance. However, this process is highly informalized, first of all, regarding the stage of these tools implementation in pilot and production operation. This factor determines the relevance of determining the most significant aspects of the process of digital tools implementation in public administration, as a necessary component of its formalization and transition to using the quantitative calculation of the effectiveness of measures for digitalization of public administration. The purpose of this study is to analyze the processes of preparation for the operation of digital tools of municipal organizations in the context of municipal-regional interaction. On the basis of the purpose, the study defined a number of tasks, including the analysis of the regulatory consolidation of digital tools, technical-technological and human factors of their implementation. Normative legal acts of public authorities, official digital publications of state and municipal organizations, scientific publications on the digitalization of public administration were the basis of the study. Within the framework of the study, a set of factors that have a key impact on the efficiency of digital instrument implementation was identified based on the analysis of the processes of preparation for the digital instruments operation. In accordance with the grouping carried out, human resources, infrastructure, software, hardware and organizational factors, as well as their interaction were considered. The process of regulatory consolidation of the use of innovative digital public administration tool is considered, and the necessary requirements for its optimization are highlighted.

Keywords: innovation, information technology, local government, models, regional management, digital technology

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Introduction

Complex processes caused by changes in the technological base of public administration every year have an increasing impact on socio-economic processes that are implemented both at the international and national levels, and at the level of regions [1]. Therefore, it is difficult to overestimate the impact of information systems for interaction with the industry, changes in the tools for providing tax accounting, etc.

Changes, albeit on a smaller scale, are also being implemented at the municipal level [2, 3]. And, despite the fact that municipal organizations are able to independently implement projects in the field of informatization, the most promising is the system of municipal-regional interaction in the implementation of digital tools [4].

The validity of this assumption is confirmed by the results of the IQ-cities rating, compiled by the Ministry of Construction of the Russian Federation, and taking into account the achievements of municipalities in the field of informatization. Therefore, Moscow region, in which the system of municipal-regional interaction is implemented, is the leader in terms of the number of cities occupying high positions in the ranking [5].

However, this system is largely unformalized, and most of all – in relation to the processes of direct implementation of digital tools into operation, which necessitates the identification of the main aspects of this process to increase its formalization and, in the future, the use of mechanisms for quantitative calculation of the effectiveness of measures.

It should be noted that, despite the relatively large number of works related to the study of the issues of public administration digitalization, most of them are primarily of an overview nature, or are associated with the study of a social effect that is difficult to formalize.

The purpose of this study is to analyze the processes of preparing for the operation of digital public administration tools in the activities of municipal organizations in the implementation of municipal-regional interaction, on the basis of which the following tasks are determined:

- analysis of the processes of the digital tool regulatory consolidation;
- study of technical and technological factors of preparation for operation;
- analysis of the structure of personnel factors in the preparation of a digital tool for operation.

As part of the preparation of this work, an analysis of publications on the issue of digital labor tools in the activities of municipal organizations, as well as the processes of interaction between local governments and the executive authorities of the Russian Federation in the process of public administration digitalization, was made.

A significant role in the study belongs to the analysis of the regulatory documentation of public authorities, as well as publications on the official resources of such authorities.

When preparing the study, the following methods were used: analysis and synthesis, economic and statistical analysis, abstract-logical method and system analysis of data. In this study, methods such as observation, statistical, regulatory and economic analysis were used to the greatest extent.

Results and discussion

Preliminary work on introducing a digital tool into the activities of a municipal organization inevitably includes a preliminary stage, during which the need for a new tool is identified, the goals and objectives of its implementation are determined [6]. It should be taken into account that it is at this stage that municipal-regional interaction is most manifested, which is currently expressed, as a rule, in the provision of digital tools to municipalities and the feedback collection [6].

According to the results of the preliminary stage ("initiation"), it is possible to implement the stage of preliminary implementation ("modeling"), where the choice of the optimal model for the tool implementation is carried out, after which the stage of its introduction is implemented.

The processes described in this article refer to the intermediate stages of the implementation stage, following after the completed tool design completed by the start of trial operation. However, their critically significant nature requires separate consideration.

Normative consolidation of an innovative tool use is an integral element of the process of using a digital tool, because the impact of the new instrument on the sphere of public authority is extremely great [8]. Nevertheless, it is at this stage that the influence of regulatory factors is maximum, which requires special attention to the principle of regulatory consolidation.

This principle involves ensuring the regulatory consolidation of all economically significant aspects of the processes associated with the implemented innovative labor tool.

Therefore, the following should be legally fixed:

- purpose of use; individuals and departments responsible for the functioning of the tool at various levels of management;
- sources of modernization and maintenance of tool operation;
- the procedure for resolving disputes related to the functioning of the instrument;
- mechanisms for monitoring and evaluating performance;
- the procedure for making a decision to change or withdraw the tool from service;
- the procedure for interaction with subordinate and superior organizations when using the tool;
- security measures;
- permissible scope;
- operational documentation.

The lack of properly fixed regulatory mechanisms for interaction can lead to complex structural conflicts, reduce the effectiveness of using the tool, as well as worsen the socio-psychological climate in the organization [9].

According to the results of the regulatory consolidation of the implementation process, the stage of preparation for operation, which is schematically presented in *fig. 1.*, is implemented. This stage, within the framework of preparatory measures, involves combining actions aimed at bringing the level of impact of all possi-

ble internal environment resource factors to a value that ensures the design characteristics of an innovative tool operation.

Resource support is given in the planning documents. Therefore, the change in reality in the necessary vector, corresponding to the possibility of implementation and further operation, provides for the implementation of all these measures for all groups of factors presented in *fig. 1*. Inconsistency of one of the factors due to the complex nature of the tool environment, jeopardizes the entire implementation process.

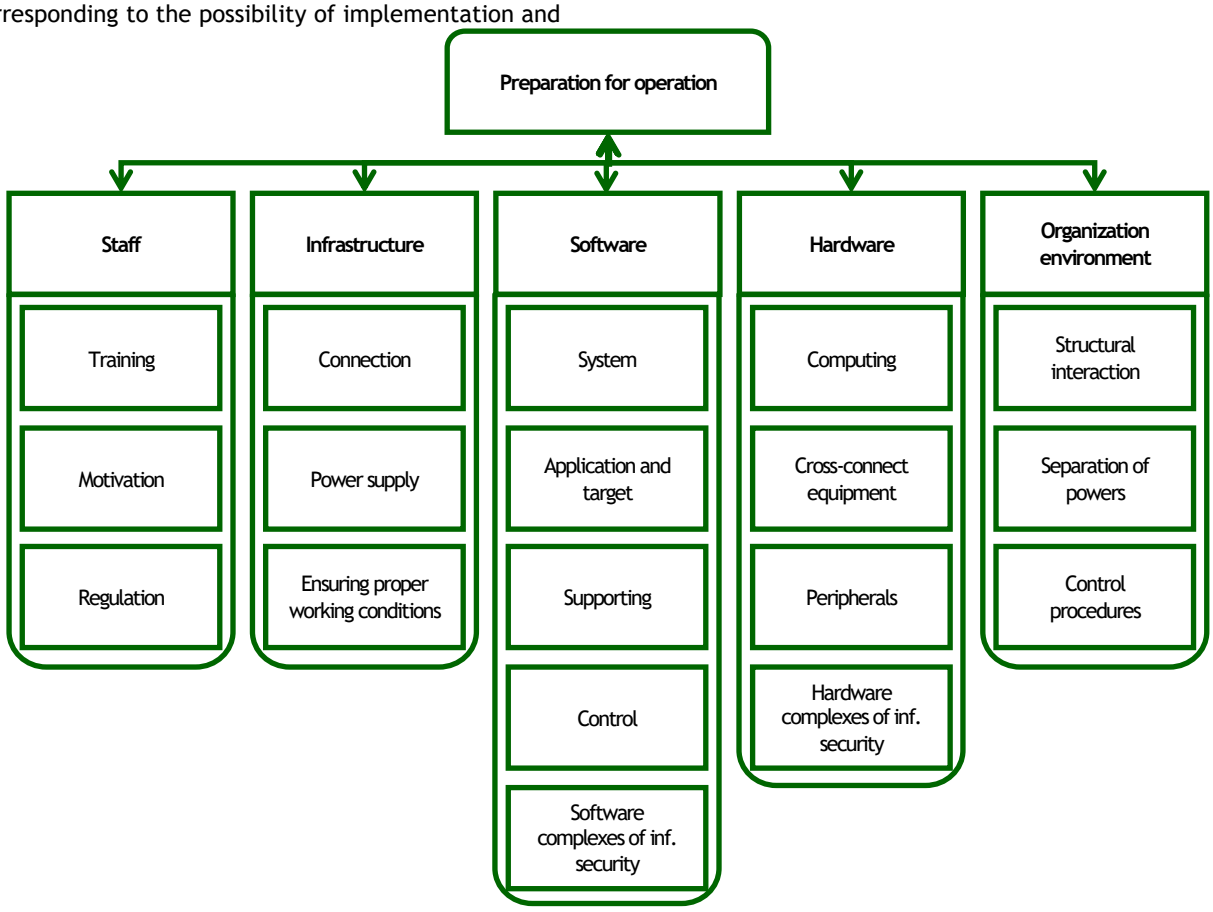

Fig. 1. **Factor analysis of preparing a digital tool for operation**

Source: complied by the authors

The infrastructure group is the first obstacle to the tool implementation. So, if there is no access to the computer network in the premises where the tool is planned to be used, the equipment cannot be powered by electricity, the tool cannot be put into operation, and the working conditions are dangerous for employees.

This group can become a significant barrier to implementation, because all its constituent factors, in the context of the modern approach to the organization of work in municipal organizations, have a certain relationship – the absence of electricity may suggest that this room is not intended for the constant stay of people in it, which leads to the lack of proper conditions for labor and access to communications infrastructure. In this regard, the plan must certainly define those premises where the infrastructure meets the necessary requirements.

The hardware environment is especially significant for digital innovation tools [10]. So, the insufficient computing power of a PC significantly slows down the work of the digital tools used [11]. Therefore, it is necessary to implement the following measures:

- monitoring the technological level of computer technology;
- ensuring the implementation of its depreciation processes;
- using the system of passports for the productivity of computing equipment (this measure acquires a special role when it is used as an integral element of the digital twin of the municipal body);
- availability of a reserve fund of equipment.

Unlike the first three measures, which are characterized by qualitative indicators, the reserve fund of equipment can be calculated quantitatively using the formula (1):

$$RC = \frac{\sum_i^n (C_{lp})}{C_{ci}} + \frac{AHCS}{100}, \quad (1)$$

where RC is the number of redundant computing equipment by type (pcs.); C_{ci} – the cost of purchasing a new PC complex (rubles); AHCS – average number of employees using ICT (persons); C_{lp} is the payment for the downtime of the process with the use of an innovative labor tool, associated with the failure of computer equipment (rubles).

The ratio of labor costs for downtime and the cost of a new PC complex indicates the number of PC units that can offset the negative effect of downtime. Additional addition of the obtained indicator with the average headcount divided by 100 makes it possible to provide an additional reserve due to the headcount of the organization in case of simultaneous failure of several PCs. The resulting total value is rounded up.

C_{lp} can be calculated using the formula (2):

$$C_{lp} = Tu_u * L_{pu} + \sum_i^n (Tu_c * L_{pc}), \quad (2)$$

where Tu_u – downtime of the user of an innovative labor tool due to the failure of computing equipment (hour); L_{pu} – remuneration of the user of the innovative labor tool per hour (rubles); Tu_c – downtime of an organization employee due to the inability to use the results of the innovative tool user's work due to the failure of computer equipment (hour); L_{pc} – wages of the organization employee affected by the event per hour (rubles).

The use of this methodology for calculating the need for computer equipment reserves will make it possible to level the risk of inefficient use of a labor tool due to failure of a PC. In addition to a PC, this scheme makes it possible to calculate any hardware components for personal or small collective use.

Calculation of the amount of redundant server equipment is possible using a simplified formula (3):

$$RC_s = \frac{\sum_i^n (C_{lp})}{C_{cs}}, \quad (3)$$

where RCs– the number of backup server equipment (pcs); C_{ci} – the cost of purchasing a new set of server equipment (rubles).

The following preparedness factors are of key importance for the successful implementation of an information system within the "staff" group:

- technological;
- socio-psychological;
- coordinating and methodical.

Technological factors include both the possession of the team by a number of knowledge on the mechanisms of functioning and application of the theory and practice of using the tool, and the actual availability of the possibility of using this technology. These factors are interrelated, however, due to the introduction of an innovative tool and personnel movement processes, a discrepancy between the technological base and the employees' knowledge and skills may appear. So, with a sudden change of personnel, the ability to use outdated technologies may be temporarily or permanently lost, an example of which may be the lack of specialists in the Cobol programming language, which was widely used in the second half of the 20th century in the US banking and archives, but now outdated. On the contrary, for specialists who have not improved their skills for a long time, it will be difficult to use new technologies [12].

Socio-psychological factors are in matters of personnel motivation and reduction of the level of its opposition to organizational changes. Both of these issues have been widely studied within the framework of management as a field of scientific knowledge, which provides the person responsible for introducing the implementation of an innovative tool with a wide range of methods to choose from for use in directly emerging situations.

Coordination and methodological factors include issues of the interaction order of each individual user with elements of the innovative tool environment.

The results obtained in the framework of the study are of a theoretical nature and are largely abstract. However, these properties of the results are deliberately obtained to ensure the possibility of wide application of digital tools of various profiles in the implementation.

Conclusion

So, within the framework of the study, the analysis of the factors of the processes of preparing for the digital tools operation in the framework of municipal-regional interaction was made.

Based on the analysis of objective labor processes, the structure of the processes of normative consolidation of a digital tool introduction was revealed. The role of normative consolidation of a digital tool functioning during the preparation of the system for operation is determined.

In the process of analyzing the factors that have a key impact on the course of the stage of preparing a digital tool for operation, a comprehensive assessment of personnel, infrastructure, software, hardware and organizational factors, as well as their interactions, was carried out.

Based on the work done, it should be noted that the consideration of the preparatory work factors given in the study at the stage of direct implementation is currently insufficiently taken into account when using modern digital public administration tools. At the same time, the lack of comprehensive information on these factors ensures an increase in the risk of inefficient use of the implemented tool.

The use of an integrated approach, in accordance with the one given in this article, or a similar methodology, can provide, in conjunction with the formalization of other elements of the process of using digital tools, the development of an integrated technology for the application of digital innovations in municipal-regional interaction.

Authors' contribution

Veselovsky M.Ya.: general management of the project, analysis and addition of the text of the article. Sidorov M.A.: collection and processing of materials, preparation of the initial version of the text.

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