

# TERRITORIAL FINANCE

DOI: 10.15838/ptd.2025.6.140.3

UDC 332.05 | LBC 65.9(2Rus)-98

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## BUDGET PROCESS DIGITALIZATION AT THE MUNICIPAL LEVEL: PROBLEMS AND PROSPECTS OF DEVELOPMENT



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*In recent decades, digitalization has firmly entered the sphere of state and municipal administration, including the budget system of the Russian Federation. Currently, the concept of electronic budgeting is actively developing and being implemented both at the federal and regional levels, which is confirmed by extensive scientific research. However, the issue concerning the use of digital technologies in the budget process remains insufficiently studied. The aim of our work is to identify the problems and prospects of digitalization of the budget process at the municipal level to find effective ways to overcome emerging technical, personnel, organizational and institutional difficulties. For this purpose, we conducted in-depth interviews with 45 experts in the field of budget system development, namely government and municipal employees from various Russian regions, and specialists from federal financial authorities. The paper outlines the specifics of the digitalization*

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**For citation:** Rastvortseva S.N., Panina E.V. (2025). Budget process digitalization at the municipal level: Problems and prospects of development. *Problems of Territory's Development*, 29(6), 30–44. DOI: 10.15838/ptd.2025.6.140.3

*of the budget process of municipalities, the problems that arise are classified into groups: technical, personnel, organizational, institutional, and the compliance of this issue with international practice is noted. The article reveals that the updating of technologies and the legislative framework does not occur synchronously, which reduces the effectiveness of implementing digital solutions in the budget process. The role of the internal public finance management system is defined, the features of using various software solutions and the problems of their integration with the state integrated information system are presented. The conducted research allowed formulating proposals for improving the digitalization of the budget process, make recommendations on the integration of various information systems, create a single training resource and improve methods of technical and organizational support in the field.*

*Electronic budget, digitalization, digital technologies, local government, interviews, regions and cities of Russia.*

## ACKNOWLEDGMENT

*The research was funded by the Russian Science Foundation, grant 25-28-01533, <https://rscf.ru/project/25-28-01533/>*

## Introduction

Over recent decades, the development of telecommunication networks, especially the internet, and the active implementation of technologies have significantly transformed approaches to state and municipal governance worldwide. One of the key directions of this new policy has been e-budgeting, which contributes to improving the quality, accessibility, transparency, and speed of providing state and municipal budget services (Leiman, 2011; Abramov, Andreev, 2023). According to data from a separate territorial body of the Federal Treasury, the daily volume of transactions at the regional level has reached an average of over 65 million rubles per day<sup>1</sup>.

In Russia, the active use of information and communication technology (ICT) capabilities in the public sector began with the launch of the “Treasury’s Automated System” (PPO AS FK) within the framework of the Federal Target Program “Electronic Russia” in 2002–

2004, and continued with the implementation of the state integrated information system (GIIS) “Electronic Budget”. Since 2011, these measures have led to the formation of more effective revenue and expenditure structures for municipal budgets, simplified administrative procedures for officials, and increased the degree of involvement of interested residents in the processes of budget formation and expenditure (Gron, 2012).

The use of information and communication technologies (ICT) in regional and municipal budget work has many advantages, but only with well-tuned algorithms and uninterrupted operation of equipment and data transmission networks, which is possible with an organized information security system. However, about 24% of Russian organizations still do not use means of protecting information transmitted over global networks<sup>2</sup>. An important remaining factor is the insufficient qualifications of state and municipal employees: according

<sup>1</sup> Federal Treasury Department for the Altai Territory. Quantitative indicators for 2024. Available at: <https://altay.roskazna.gov.ru/o-kaznachejstve/istoriya-ufk/3-sovremennaya-istoriya-razvitiya-ufk-po-altayskomu-krayu/istoriya-v-tsifrah/kolichestvennye-pokazateli-za-2024-god>

<sup>2</sup> Federal Treasury Department for the Altai Territory. Quantitative indicators for 2024. Available at: <https://altay.roskazna.gov.ru/o-kaznachejstve/istoriya-ufk/3-sovremennaya-istoriya-razvitiya-ufk-po-altayskomu-krayu/istoriya-v-tsifrah/kolichestvennye-pokazateli-za-2024-god>

to data from the Russian Ministry of Digital Development and Rosstat, the share of state and municipal employees who received training in digital transformation competencies was 0.4% in 2021 and only increased to 0.7% in 2022 of the total average number of employees in organizations<sup>3</sup>. As a result, problems with ICT implementation, including in budget processes, have intensified both in Russia and in other countries worldwide (Losev, Karas, 2018; Wiredu, 2010; Effah, Nuhu, 2017).

The aim of this work is to identify and analyze the problems of digitizing the budget process at the municipal level to determine prospects and develop recommendations for further development. The scientific novelty of the research lies in identifying (using the method of in-depth interviews with a wide range of practicing experts) and systematizing the problems of digitizing the budget process at the municipal level in Russia, which have been classified into groups (technical, personnel, organizational, and institutional). The correspondence of the identified problems with international experience has been established, and systemic and situational difficulties characteristic of the local government level have been specified. Directions for the optimal development of budget process digitization in municipalities are proposed, along with recommendations for forming a unified information system from disparate components, creating a unified educational resource, and improving methods of technical and organizational support on the ground.

### **Problems of budget process digitalization (literature review)**

Based on the analysis of publications by Russian and foreign researchers, we

can distinguish four blocks of problems in budget process digitalization: technological, institutional, organizational, and personnel-related. Let us examine them in more detail.

The most common difficulties remain those related to the technical functioning of information systems used for public finance management. Despite the implementation of the “Electronic Budget” system since 2015, challenges with data entry and processing persist (Podosinnikov et al., 2016). Additional difficulties are caused by a shortage of necessary equipment, the use of morally obsolete technologies, and the absence of modern software solutions, which reduces the efficiency of financial department employees (Losev, Karas, 2018).

Similar problems are observed in other countries worldwide, possibly because the digital transformation of the budget process “has an artificial character, and the system rejects them due to being unprepared for adoption” (Blinichkina, 2024). In local government bodies in Ghana, difficulties with obtaining access arose when using information systems for working with public finance data (Effah, Nuhu, 2017). Insufficient equipment capacity is a challenge faced in South Africa (Hendriks, 2012). Meanwhile, in European countries, investments in digital technologies are recognized as an important factor for socio-economic growth (Rastvortseva et al., 2023; Lnenicka et al., 2024).

Institutional complexities include, for example, the slow change in the regulatory framework to consider the needs for ICT in the budgetary sphere (Ermakova, Gureeva, 2018; Uskov, 2024). Although the regulation of the GIIS “Electronic Budget” is stipulated by the Budget Code of the Russian Federation, the current

<sup>3</sup> The number of state (municipal) employees and employees of institutions who have been trained in competencies in the field of digital transformation of public and municipal administration. Available at: <https://www.fedstat.ru/indicator/62111> The average number of employees in a full range of organizations since 2017. Available at: <https://www.fedstat.ru/indicator/58699>

public finance management system does not fully cope with the tasks of effective administration and poorly accounts for regional specificities. This reduces the interest of state and municipal employees in its use (Losev, Karas, 2018).

Organizational complexities include the persistence of internal paper-based document flow, inconsistency in digitalization policies, untimely updates of the regulatory framework concerning functionality (Wiredu, 2010; Hendriks, 2012; Effah, Nuhu, 2017), disruptions in the operation of information systems, and a lack of interaction between different divisions of government bodies (Wiredu, 2010).

Another organizational difficulty is the insufficient realization of one of the key tasks of budget process digitalization – ensuring the accessibility and transparency of financial information for a wide range of citizens. The “Electronic Budget” system lacks the capability to create personalized user accounts, and the presented information is often difficult to understand (Efimov, 2018). This is apparently due to a deeper systemic problem: in Russia, accessible and understandable explanations for most draft laws have still not been developed, which, in turn, reduces citizen engagement in public and legal participation processes (Molchanova, 2017).

The shortage of qualified personnel remains a significant obstacle. Employees are forced to adapt to constantly updating requirements and changes in system operating rules, which not only complicates their work but also leads to a decrease in data processing quality (Losev, Karas, 2018; Timushev, 2023). Similar personnel difficulties are recorded in other countries. For instance, in Chile, Bolivia, and the United Kingdom, a shortage of specialists with the necessary digital competencies is noted, while in South Africa, researchers estimate a significant obstacle is the generally low qualification level of the existing staff (Berthin et al., 2004; Wiredu, 2010; Hendriks, 2012).

Thus, the digitalization of the budget process at the municipal level in Russia faces problems similar to international ones. Solving them requires a comprehensive approach: modernizing information systems, updating legislation, improving organizational structure, and developing personnel.

However, questions remain regarding the scale of e-budgeting implementation in municipalities and the consequences of applying digital solutions. The relevance of studying digitalization is heightened in the context of emerging new technologies – the digital ruble, artificial intelligence, and lean management. Deep analysis and timely elimination of the identified problems will form the basis for a successful transition to new technological solutions and for increasing the effectiveness of public finance management.

### **Research methodology**

To identify the problems and features of budget process digitalization in municipalities, we conducted in-depth interviews with experts and practitioners in the field of the budget process (*Tab. 1*). This methodology aligns with research (Berthin et al., 2004; Effah, Nuhu, 2017) where interviews were conducted with different groups of respondents depending on their role in the budget process.

The respondents for the interviews were employees of organizations and specialists, predominantly with work experience ranging from 10 to 35 years. The duration of each meeting was between 30 minutes and 1.5 hours. Interviews were conducted either in person or by phone.

The main topics covered key aspects of the establishment and development of budget process digitalization, from the first mentions and perception of the idea of implementing the “Electronic Budget”, including the introduction of own financial management systems in

**Table 1. Composition of participants in in-depth interviews on budget process digitalization at the municipal level**

Group	Category of respondents	Quantity	Organization / region
Internal	Specialists, IT Department	2	Ministry of Finance of the Russian Federation
	Specialist, Department of Legal Regulation of Budgetary Relations	1	Ministry of Finance of the Russian Federation
	State civil servants of regional financial bodies	19	Krasnodar Territory, Stavropol Territory, Khabarovsk Territory, Republic of North Ossetia – Alania, Karachay-Cherkess Republic, Republic of Mordovia, Arkhangelsk, Volgograd, Irkutsk, Kaluga, Kaliningrad, Kirov, Kostroma, Nizhny Novgorod, Novosibirsk, Saratov, Sverdlovsk, Smolensk, Chelyabinsk regions
	Municipal servants	21	6 municipal districts, 3 municipal okrugs, 2 urban okrugs of Stavropol Territory, Republic of Crimea, Vladimir, Volgograd, Vologda, Kaluga, Kirov, Orenburg regions
External	Expert from the ANO "Center for Strategic Research"	1	ANO "Center for Strategic Research"
	Deputy director for business development	1	Company-developer of the GIIS "Electronic Budget"
Source: own compilation.			

regions and municipalities, to the final stage of project implementation, as well as user participation in this process. A separate block of questions, occupying about 60% of the time, was dedicated to identifying problems within the previously outlined categories: technical, institutional, personnel, and organizational. To assess the degree of interaction between levels of government, clarification was also sought on which problems at the local level are the most acute and persistent from the perspective of municipal servants, and which ones are from the perspective of state civil servants.

### Research results

#### *The establishment of budget process digitalization in Russia*

The digital transformation at the regional and municipal levels began in 2002 with the launch of the Federal Target Program

“Electronic Russia”. However, some regions had already started implementing digital technologies on their own initiative as early as 1992. As one specialist from the Russian Ministry of Finance noted, “regions with greater budgetary capabilities could purchase programs for digitizing individual processes, but there was no unified digitalization strategy”<sup>4</sup>.

Starting in 2002, the active automation of the budget process commenced, and the first information systems for budget planning and execution were developed. From 2011 to 2021, informatization took on a systematic character: a system for interagency electronic interaction was introduced. Within the framework of the state program “Information Society”, the State Integrated Information System (GIIS) “Electronic Budget” was created<sup>5</sup>. This was also accompanied by a growth in expenditures under the “Communications and Informatics”

<sup>4</sup> Here and below, quotes from the respondents’ answers are given in quotation marks.

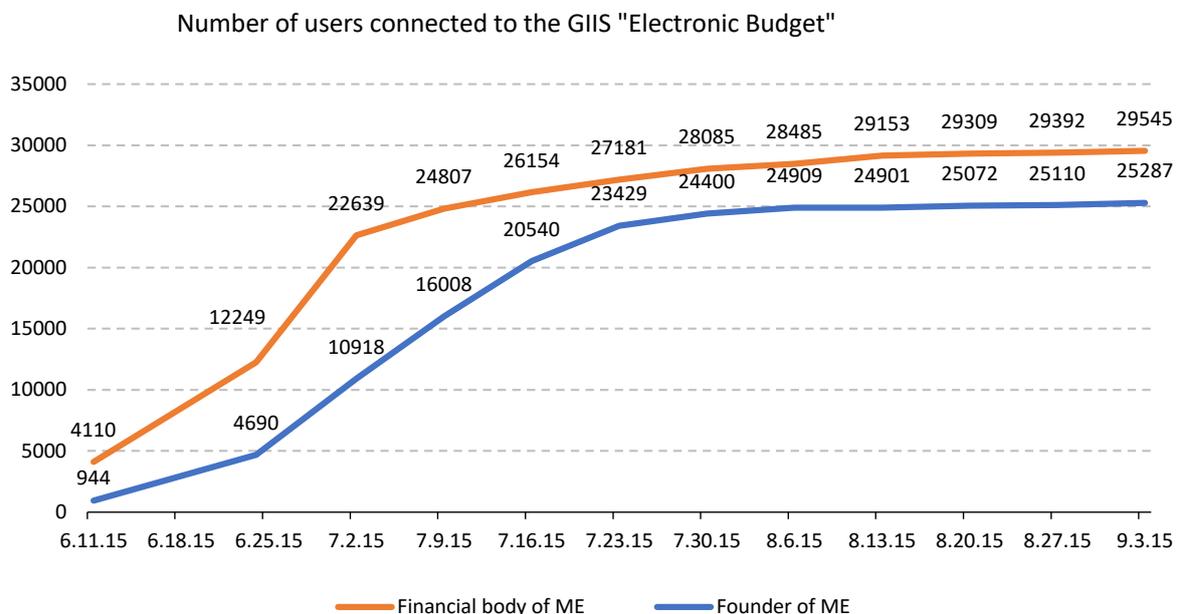
<sup>5</sup> The concept for creation and development of the state integrated information system for public finance management “Electronic Budget”. RF Government Resolution 1275-r dated July 20, 2011.

line item: according to data from the Federal Treasury on the execution of consolidated budgets of the Russian constituent entities, the total volume of expenditures increased from 65.2 to 239.7 billion rubles.

The full-fledged establishment of the digital ecosystem in the budgetary sphere continued amidst the development of the GIIS "Electronic Budget" and the launch of the Unified Budget System Portal between 2012 and 2015. From an architectural standpoint, the GIIS "Electronic Budget" became the main operational environment for participants in the budget process (employees of financial bodies), intended for the planning, execution, accounting, and control of budgetary funds. In turn, the Unified Budget System Portal (UBSP) is primarily an external information resource, the "public face" of the system, ensuring the openness and accessibility of budget data for citizens. The UBSP is functionally and informationally dependent on the GIIS "Electronic Budget," as the data for publication

on the portal is generated and loaded from the GIIS modules. Thus, the GIIS is an internal working tool, and the UBSP is its external interface, ensuring transparency. With the start of active dissemination of information about the UBSP, most state and municipal employees noted that budget digitalization actually began only in 2013–2016. Moreover, municipal employees tended to indicate an even later date. The actual connection to the GIIS for public finance management "Electronic Budget" started in the summer of 2015, from June to September, when authorities at all levels received the obligation to integrate into the system.

As early as the beginning of June 2015, almost a third of the total number of applications for connection from municipalities had been submitted. Active connection dynamics were observed further on, with municipalities connecting more employees – by the beginning of July, more than one employee per organization was already connected (Fig. 1).



**Figure 1. Dynamics of the number of users connected to the GIIS "Electronic Budget" after the portal launch**

Compiled based on: statistics on user connections to the State Integrated Information System for Public Finance Management "Electronic Budget" as of June – September 2015. Federal Treasury. Available at: <https://roskazna.gov.ru/gis/ehlektronnyj-byudzhet>

Opinions on the significance of the budget process digitalization were divided. Many interviewees called it “long-overdue” and necessary, noting its potential for optimizing work, increasing transparency, reducing administrative barriers, and accelerating document flow. The creation of a unified digital ecosystem was seen as a step toward modernizing the budgetary system.

However, some respondents, primarily municipal employees, did not have a clear position regarding the reform. According to one specialist, the system seemed “new and incomprehensible”, with information being limited and generalized. Initially focused on the federal level, the system was rolled out to regions and municipalities without considering local specifics, leading to a formalistic attitude towards fulfilling the task.

### ***Technical complexities and system diversity issues***

From the start of the “Electronic Russia” Federal Target Program, local financial management systems emerged in each of the analyzed regions and municipalities. For automating accounting and all stages of the budget cycle, software products from third-party developers were used.

The deployment of the GIIS “Electronic Budget” locally was carried out gradually, taking into account the readiness level of individual system components and as relevant regulatory documents were adopted. Starting in 2018–2019, municipal users gained access to the system, which allowed for the legal formalization of agreements on transferring intergovernmental subsidies from regional to municipal budgets.

During 2018–2020, authorities began actively using the Unified Budget System Portal (UBSP), where, in accordance with Order 243n of the Russian Ministry of Finance dated December 28, 2016, they were obligated to post budget

information. This measure ensured centralized data storage and increased the transparency of the budget process.

It was then that a series of technical difficulties emerged – a block of problems noted by over 80% of the surveyed state and municipal employees. The GIIS frequently froze, data uploads failed, and the unified portal operated slowly. A certain pattern in system performance was observed: before noon, the GIIS worked relatively stably, but after the start of the working day in the European part of the country, the system slowed down significantly and sometimes stopped functioning altogether. To complete the process, as noted by a municipal employee from the Stavropol Territory, “one had to work at night”.

Problems also intensified particularly during reporting periods when the load increased. Budget drafting and approval in municipalities occur later than at the federal and regional levels, as it is necessary to consider higher-level plans. However, due to the large number of municipalities and late data uploads, the system could not handle the volume, indicating both technical and organizational issues. This problem was noted by many interviewed state employees who had to monitor municipalities and report on the untimely fulfillment of obligations at the federal level.

A representative of the Russian Ministry of Finance noted that the successful functioning of the GIIS directly depends on the interaction between regions and municipalities, particularly regarding advisory support. In his words, “the Ministry of Finance should not merely parrot instructions”. This means that the responsibility for on-the-ground information support should lie with the constituent entities of the Russian Federation. However, given the advisory nature of this work, in many regions and municipalities, it either was not conducted at all or was carried out to a limited extent and only on the regions’ own initiative.

### ***Personnel-related difficulties of digitalization***

Despite the launch of the GIIS “Electronic Budget,” its integration with existing regional and municipal platforms was never realized. One specialist from the Russian Ministry of Finance emphasized that the GIIS does not account for the specifics of local processes. Integration requires the purchase of additional solutions, for which municipalities often lack funds (Lyulko, 2023). According to the data cited earlier, the share of municipal expenditures under the “Communications and Informatics” line item in the consolidated budgets of the Russian constituent entities decreased from 3.8% in 2016 to 1.9% in 2023. The shortage of their own funds slows down the digitalization process at the local level.

In a number of regions that had their own developments in the field of financial management, integration with the GIIS “Electronic Budget” proceeded smoothly. However, for most constituent entities, this opportunity was limited, forcing authorities to manually transfer data into the GIIS. This was accompanied by significant difficulties, especially when preparing reports for the Unified Budget System Portal.

Such problems were apparently caused by methodological uncertainty – the absence of a clearly formulated structure and functionality for the GIIS from the Russian Ministry of Finance and the Federal Treasury. Initially, the “Electronic Budget” was developed for the needs of the federal level; regional proposals were not considered, unlike in the AIS “Finansy” (Finance), where an open approach with pilot regions and surveys was used. As one respondent noted, “they stopped asking because there was a lot of negative feedback regarding the final implementation”, which led to constant negativity and a lack of motivation among users to work within the system.

The personnel problem was noted by respondents as significant: without technical support from the financial bodies of the Russian

constituent entities and developer companies, the implementation of internal systems and the GIIS would have been impossible. This problem remained unresolved for a long time, although specialists from the Russian Ministry of Finance suggested the possibility of addressing it through “programs to improve competency levels” in municipalities.

At the time of the study, regions were experiencing an acute shortage of qualified personnel, especially in the field of information technology. As the survey showed, not a single municipality had its own in-house system administrator. All configuration and maintenance work was performed remotely by employees of developer companies or specialists from the financial departments of the Russian constituent entities. For municipalities, digitalization created additional difficulties.

Staff training was fragmented. Only a portion of the employees (18% of those surveyed) participated in webinars, mainly organized by regional authorities. For instance, in the Vologda Region, the initiative to train employees was taken on by the Department of Finance and Tax Policy. The program included system installation and initial connection. To monitor material comprehension, especially in remote districts, checklists were used to assess how effectively the instructions were conveyed.

In the Novosibirsk Region, training for employees of municipal financial bodies took place at an institution subordinate to the regional financial authority. The seminars aimed to improve staff qualifications and enhance their interaction with the system. However, in a number of constituent entities, training either was not conducted at all or was limited to self-learning the system through “trial and error”.

Many municipal employees were also unaware of the opportunity to participate in video conferences and webinars organized by the Russian Ministry of Finance and the Federal Treasury. While information about such

opportunities was communicated centrally in regional bodies, at the municipal level, it often was not disseminated properly.

It should be noted that, despite initial plans, a unified training resource for working with the GIIS “Electronic Budget” has not been created to this day. According to one Ministry of Finance employee, “the idea of creating such a platform did not receive proper development” and, ultimately, remained unrealized.

### **Organizational complexities**

In addition to personnel and technical difficulties, significant organizational problems emerged during the implementation and operation of the GIIS “Electronic Budget”. Difficulties arose with using electronic signatures and data entry, exacerbated by the lack of official instructions and lists of authorities. Sometimes data were displayed incorrectly or failed to load altogether.

Particular difficulty was caused by the daily posting of information according to Order

243n: the system’s interface was inconvenient, filters were absent, and published information could not be edited, which increased the risk of errors and complicated work.

Uploading information to the registry of budget process participants was also accompanied by failures. Municipal employees attributed this to a lack of clear methodological guidelines – the available materials were too general.

When technical errors occurred, contacting the support service often did not yield quick results: resolving problems took weeks, and sometimes help was not provided at all. Municipalities were forced to turn to regional financial bodies or seek help from colleagues in other municipalities.

In remote settlements, the situation was complicated by poor internet connectivity. In some cases, authority to work with the system was transferred to the regional level. Despite improvements, internet access in government bodies still does not exceed 60% (Fig. 2).



**Figure 2. Share of organizations (by OKVED Section O "Public Administration and Military Security; Social Security") using the internet, as a percentage of the total number of registered organizations in OKVED Section O**

Note: before 2016 – Section L "Public Administration and Military Security; Social Security". Data for 2020 are excluded due to the use of a different methodology for indicators. For 2021 and 2022, data on the use of fixed (wired and wireless) internet are used.

Calculated based on: Information on the use of digital technologies and the production of related goods and services (results of statistical observation form No. 3-inform). Available at: <https://rosstat.gov.ru/statistics/science>; Number of organizations according to state registration data from 2017. Available at: <https://fedstat.ru/indicator/58109>; Number of organizations according to state registration data up to 2016. Available at: <https://fedstat.ru/indicator/42930>

In one municipal district, a hacker attack was recorded, which led to the complete destruction of data and the impossibility of restoring it from backups. The new antivirus protection for the server proved ineffective, which became a reason for further use of paper-based document flow, as employees lost trust in new data storage methods and cloud technologies.

**Institutional problems**

During digitalization, institutional difficulties arose, related to the different speeds of change in technology and the legislative framework. The system’s functional capabilities often lagged behind the requirements established by regulatory legal acts. Municipal employees noted that in some cases they needed to post information using features that had not yet been implemented in the GIIS “Electronic Budget” at that time. This led to difficulties in fulfilling duties and created a situation

where compliance with legal norms became technically impossible.

Digital technologies in the budget process cannot keep up with legislative requirements, especially in emergency cases. One example of the system’s operational adaptation was the implementation of functionality for accounting for medical and child payments during the COVID-19 pandemic, which required prompt changes to the GIIS “Electronic Budget.”

**Summary of problems and development prospects**

Thus, the digitalization of the budget process not only complicated the work of municipal employees but also led to a number of situational problems, most of which were directly related to the system implementation stage and were resolved promptly, and systemic problems, requiring a comprehensive solution. Their list is presented in *Table 2*.

**Table 2. Systemic and situational problems of implementing and operating internal systems and the GIIS "Electronic Budget" in the budget process at the municipal level**

Type of problems		Systemic problems	Situational problems
Technical		Technical difficulties and inconvenience in data entry	System malfunctions
			Problem with Internet access
			Lack of software
			Hacker attacks
Organizational		Absence of a unified methodology for working within the system	
		Lack of consideration for regional and municipal specificities	
		Preservation of internal paper-based document flow	
		Disintegration of information systems	
Institutional		Different speeds of changes in the regulatory framework and technology implementation	
Personnel	Internal	Shortage of human resources	
		Shortage of IT specialists	
		Lack of qualified specialists	
	External	Limitations of participatory budgeting	
		Complexity and incomprehensibility (lack of transparency) of budget data for citizens	

Source: own compilation.

The digitalization of the budget process at the municipal level is already demonstrating positive results. The GIIS “Electronic Budget” operates stably, except during scheduled maintenance and reporting periods. The ability to filter and edit data has improved work flexibility; for example, at the request of employees in the Kostroma Region, a function for adjusting regulatory acts was added.

Nevertheless, problems such as delays in data updates, failures when filling out public pages, and the absence of a unified methodological manual persist. Although technical support responds within three days, the need to contact regional financial bodies and the Federal Treasury remains.

Looking ahead, an expansion of the system’s functionality is expected – the implementation of electronic signatures, services based on artificial intelligence, and voice interfaces. A complete transition of regions and municipalities to the GIIS, abandoning local solutions, is also possible.

The Russian Ministry of Finance plans the integration of subsystems and a transition to domestic software. Key development directions will be data protection, increased processing speed, and transparency. As a result, digitalization will bring benefits both to participants in the budget process and to citizens, enhancing information accessibility.

### **Conclusions and recommendations**

Today, municipal employees acknowledge that the implementation of the GIIS “Electronic Budget” has increased the transparency of the budgetary system, but it has not led to a noticeable increase in efficiency. On the contrary, the duplication of functions with internal systems has increased the workload and complicated task completion.

Based on the conducted analysis, we conclude that regional characteristics critically influence the effectiveness of digitalization. Municipalities

with a high level of budgetary capacity and developed IT infrastructure adapt solutions faster and more successfully. At the same time, for many regions, key constraining factors are low population density, remoteness of territories, and a chronic shortage of qualified personnel. This negates the advantages of standardized digital solutions “tailored” to the federal level. Thus, the unification of processes without flexible adaptation to local conditions creates additional organizational and technological barriers rather than overcoming them.

To improve work within the system, it is necessary to develop accessible guidelines and implement an AI-powered chatbot to assist users. Modernizing subsystems to account for regional specifics and enabling open evaluation of functionality through the portal are also required.

The problem of internet access in remote regions remains relevant and can be addressed by connecting municipalities to federal programs for eliminating the digital divide. This would reduce the burden on district administrations and partially solve the personnel shortage.

To attract specialists, it is worthwhile to create programs similar to the “Zemsky Doctor” initiative. Technical issues should be handled by qualified IT specialists with decent remuneration (Zhulin et al., 2020).

It is necessary to include in plans professional development training on working with updates and integrating the GIIS with local systems. Regular webinars by the Russian Ministry of Finance and the Federal Treasury will help improve user competencies and reduce the number of support requests.

An important step will be synchronizing legislative changes with system updates, as well as implementing cloud data storage to enhance security.

Creating personal accounts for citizens within the GIIS will strengthen their participation in local budget processes.

Thus, budget digitalization has entailed both positive and negative effects. Implementing the proposed solutions will help eliminate the problems, and further research should be aimed at improving the efficiency of the digital budget at all levels of government.

## REFERENCES

- Abramov V.I., Andreev V.D. (2023). Analysis of strategies for digital transformation of Russian regions in the context of achieving national goals. *Voprosy gosudarstvennogo i munitsipal'nogo upravleniya=Public Administration Issues*, 1, 89–119. DOI: 10.17323/1999-5431-2023-0-1-89-119 (in Russian).
- Berthin G. et al. (2004). *Integrated Financial Management Systems: Best Practices: Bolivia and Chile*. Alexandria: Casals & Associates.
- Blinichkina N.Yu. (2024). Features and factors of digitalization in the modern economy. *Ekonomicheskaya politika=Economic Policy*, 19(4), 122–155. DOI: 10.18288/1994-5124-2024-4-122-155 (in Russian)
- Effah J., Nuhu H. (2017). Institutional barriers to digitalization of government budgeting in developing countries: A case study of Ghana. *The Electronic Journal of Information Systems in Developing Countries*, 82(5), 1–17. Available at: <https://doi.org/10.1002/j.1681-4835.2017.tb00605.x>
- Efimov A.V. (2018). The current stage and prospects of the implementation of the “Electronic Budget” program in the activities of public authorities and local governments. In: *Universitetskie chteniya: materialy nauchno-metodicheskikh chtenii PGU, g. Pyatigorsk, 11–12 yanvarya 2018 g.* [University Readings: Materials of Scientific and Methodological Readings of PSU, Pyatigorsk, January 11–12, 2018]. Pyatigorsk: Pyatigorskii gosudarstvennyi universitet (in Russian).
- Ermakova E.A., Gureeva O.V. (2018). Features of the introduction of digital technologies in budgetary relations. In: *Osnovnye tendentsii i perspektivy razvitiya ekonomiki v koordinatakh tsifrovoi ery: materialy Mezhdunarodnoi nauchno-prakticheskoi konferentsii, g. Khabarovsk, 23 noyabrya 2018 g.* [The Main Trends and Prospects of Economic Development in the Coordinates of the Digital Era: Proceedings of the International Scientific and Practical Conference, Khabarovsk, November 23, 2018]. Khabarovsk: Khabarovskii gosudarstvennyi universitet ekonomiki i prava (in Russian).
- Gron’ T.M. (2012). Openness of government spending. *Sovetnik bukhgaltera gosudarstvennogo i munitsipal'nogo uchrezhdeniya*, 4(88), 20–23 (in Russian).
- Hendriks C.J. (2012). Integrated financial management information systems: Guidelines for effective implementation by the public sector of South Africa. *SA Journal of Information Management*, 14(1), 1–9. Available at: <https://doi.org/10.4102/sajim.v14i1.529>
- Leiman N.I. (2011). From the electronic treasury to the electronic budget. *Sovetnik bukhgaltera byudzhethnoi sfery*, 8(104), 52–58 (in Russian).
- Lnenicka M., Luterek M., Majo L.T. (2024). Analysis of e-government and digital society indicators over the years: A comparative study of the EU member states. *Digital Policy, Regulation and Governance*, 5, 560–582. Available at: <https://doi.org/10.1108/DPRG-07-2023-0103>
- Losev V.S., Karas’ E.V. (2018). The effectiveness of the public finance management information system “Electronic Budget”. *Postulat*, 8, 1–6 (in Russian).
- Lyul’ko A.N. (2023). The evolution of smart cities: From technological projects to artificial intelligence. *EKO=ECO Journal*, 6, 8–31. DOI: 10.30680/ECO0131-7652-2023-6-8-31 (in Russian).

- Molchanova N.P. (2017). The development of public finance in the context of the digital economy. *Nauchnye issledovaniya ekonomicheskogo fakul'teta. Elektronnyi zhurnal*, 9(3), 7–16. DOI: 10.38050/2078-3809-2017-9-3-7-16 (in Russian).
- Muhamud M.M., Nalwoga M.M. (2019). Integrated financial management information system and financial reporting effectiveness of district local governments in Uganda. *International Journal of Innovative Science and Research Technology*, 4(8), 395–401.
- Podosinnikov E.Yu., Mutylina K.O., Podushkina E.V. (2016). Creation and development of mechanisms of the state integrated information system for public finance management “Electronic Budget” in the Kursk region. *Rossiiskaya nauka i obrazovanie segodnya: problemy i perspektivy*, 1, 39–43 (in Russian).
- Rastvortseva S., Panina E., Kocheshkov M. (2023). Tax instruments to stimulate innovations in EU countries. *Mirovaya ekonomika i mezhdunarodnye otnosheniya*, 67(3), 20–32. DOI: 10.20542/0131-2227-2023-67-3-20-32 (in Russian).
- Timushev E.N. (2023). The state and role of information and communication technologies in the economy of Russian regions. *Problemy razvitiya territorii=Problems of Territory's Development*, 27(4), 129–149. DOI: 10.15838/ptd.2023.4.126.8 (in Russian).
- Uskov V.S. (2024). Development of Russia's digital economy: factors and regional differences. *Problemy razvitiya territorii=Problems of Territory's Development*, 28(1), 28–41. DOI: 10.15838/ptd.2024.1.129.3 (in Russian).
- Wiredu G.O. (2010). An institutional perspective on the challenges of information systems innovation in public organisations. In: *International Conference on Electronic Government*. Berlin, Heidelberg: Springer Berlin Heidelberg.
- Zhulin A.B., Dmitrieva N.E., Klishch N.N. et al. (2020). *Otvét na vyzovy tsifrovizatsii: gosupravlenie, osnovannoe na dannikh, “shtabnaya” model' upravleniya i strukturnyi manevr v chislennosti gossluzhashchikh: Pyatigorskii gosudarstvennyi universitet* [Responding to the challenges of digitalization: data-driven public administration, a “Staff” Management Model, and a Structural Maneuver in the Number of Civil Servants]. Moscow: Izdatel'skii dom NIU VSHE.

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## ЛИТЕРАТУРА

- Абрамов В.И., Андреев В.Д. (2023). Анализ стратегий цифровой трансформации регионов России в контексте достижения национальных целей // Вопросы государственного и муниципального управления. №. 1. С. 89–119. DOI: 10.17323/1999-5431-2023-0-1-89-119
- Блиничкина Н.Ю. (2024). Особенности и факторы цифровизации в современной экономике // Экономическая политика. Т. 19. № 4. С. 122–155. DOI: 10.18288/1994-5124-2024-4-122-155

- Гронь Т.М. (2012). Открытость государственных расходов // Советник бухгалтера государственного и муниципального учреждения. Т. 4. № 88. С. 20–23.
- Ермакова Е.А., Гуреева О.В. (2018). Особенности внедрения цифровых технологий в бюджетные отношения // Основные тенденции и перспективы развития экономики в координатах цифровой эры: материалы Международной научно-практической конференции, г. Хабаровск, 23 ноября 2018 г. Хабаровск: Хабаровский государственный университет экономики и права. С. 52–57.
- Ефимов А.В. (2018). Современный этап и перспективы внедрения программы «Электронный бюджет» в деятельность органов государственной власти и местного самоуправления // Университетские чтения: материалы научно-методических чтений ПГУ, г. Пятигорск, 11–12 января 2018 г. Пятигорск: Пятигорский государственный университет. С. 87–92.
- Жулин А.Б., Дмитриева Н.Е., Клищ Н.Н. [и др.] (2020). Ответ на вызовы цифровизации: госуправление, основанное на данных, «штабная» модель управления и структурный маневр в численности госслужащих. Москва: Издательский дом НИУ ВШЭ. 47 с.
- Лейман Н.И. (2011). От электронного казначейства к электронному бюджету // Советник бухгалтера бюджетной сферы. Т. 8. № 104. С. 52–58.
- Лосев В.С., Карась Е.В. (2018). Эффективность информационной системы управления общественными финансами «Электронный бюджет» // Постулат. № 8. С. 1–6.
- Люлько А.Н. (2023). Эволюция «умных городов»: от технологических проектов к искусственному интеллекту // ЭКО. № 6. С. 8–31. DOI: 10.30680/ECO0131-7652-2023-6-8-31
- Молчанова Н.П. (2017). Развитие общественных финансов в условиях становления цифровой экономики // Научные исследования экономического факультета. Электронный журнал. Т. 9. № 3. С. 7–16. DOI: 10.38050/2078-3809-2017-9-3-7-16
- Подосинников Е.Ю., Мутылина К.О., Подушкина Е.В. (2016). Создание и развитие механизмов государственной интегрированной информационной системы управления общественными финансами «Электронный бюджет» в Курской области // Российская наука и образование сегодня: проблемы и перспективы. № 1. С. 39–43.
- Растворцева С., Панина Е., Кочешков М. (2023). Налоговые инструменты стимулирования инноваций в странах ЕС // Мировая экономика и международные отношения. Т. 67. № 3. С. 20–32. DOI: 10.20542/0131-2227-2023-67-3-20-32
- Тимушев Е.Н. (2023). Состояние и роль информационно-коммуникационных технологий в экономике регионов России // Проблемы развития территории. Т. 27. № 4. С. 129–149. DOI: 10.15838/ptd.2023.4.126.8
- Усков В.С. (2024). Развитие цифровой экономики России: факторы и региональные различия // Проблемы развития территории. Т. 28. № 1. С. 28–41. DOI: 10.15838/ptd.2024.1.129.3
- Berthin G. et al. (2004). *Integrated Financial Management Systems: Best Practices: Bolivia and Chile*. Alexandria: Casals & Associates.
- Effah J., Nuhu H. (2017). Institutional barriers to digitalization of government budgeting in developing countries: A case study of Ghana. *The Electronic Journal of Information Systems in Developing Countries*, 82(5), 1–17. Available at: <https://doi.org/10.1002/j.1681-4835.2017.tb00605.x>
- Hendriks C.J. (2012). Integrated financial management information systems: Guidelines for effective implementation by the public sector of South Africa. *SA Journal of Information Management*, 14(1), 1–9. Available at: <https://doi.org/10.4102/sajim.v14i1.529>

- Lnenicka M., Luterek M., Majo L.T. (2024). Analysis of e-government and digital society indicators over the years: a comparative study of the EU member states. *Digital Policy, Regulation and Governance*, 5, 560–582. Available at: <https://doi.org/10.1108/DPRG-07-2023-0103>
- Muhamud M.M., Nalwoga M.M. (2019). Integrated financial management information system and financial reporting effectiveness of district local governments in Uganda. *International Journal of Innovative Science and Research Technology*, 4(8), 395–401.
- Wiredu G.O. (2010). An institutional perspective on the challenges of information systems innovation in public organisations. In: *International Conference on Electronic Government*. Berlin, Heidelberg: Springer Berlin Heidelberg.

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