

# INTEGRATING DIGITAL SMART CONTROL INTO PUBLIC FINANCE MANAGEMENT FOR SUSTAINABLE GOVERNANCE

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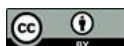
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### **Abstract**

This study develops practical recommendations for implementing SMART Control in the financial and budgetary sphere of the Russian Federation as a subsystem of the Electronic Budget State Integrated Information System (SIIS). The goal is to enhance transparency, accountability, and efficiency in public finance management by integrating preventive, data-driven oversight tools based on advanced digital technologies. The research applies a systems approach combining regulatory analysis, process mapping, and technology integration assessment. It considers international best practices, legislative requirements, and the operational needs of public finance institutions. The study proposes seven key recommendations for SMART Control implementation, including standardized electronic documentation, legal framework development, risk mapping, and the use of the digital ruble for targeted budget monitoring. The model enables real-time

### **Resumo**

*Este estudo desenvolve recomendações práticas para a implementação do SMART Control na esfera financeira e orçamentária da Federação Russa como um subsistema do Sistema Integrado de Informação Orçamentária Eletrônica do Estado (SIIS). O objetivo é aprimorar a transparência, a responsabilização e a eficiência na gestão das finanças públicas por meio da integração de ferramentas de supervisão preventiva, baseadas em dados e em tecnologias digitais avançadas. A pesquisa aplica uma abordagem sistêmica que combina análise regulatória, mapeamento de processos e avaliação da integração tecnológica. Considera as melhores práticas internacionais, os requisitos legislativos e as necessidades operacionais das instituições de finanças públicas. O estudo propõe sete recomendações-chave para a implementação do SMART Control, incluindo documentação eletrônica padronizada, desenvolvimento de arcabouço*



interaction between control bodies and budget participants, reduces duplication of processes, and increases data reliability. Anticipated benefits include improved detection of irregularities, reduced financial risks, and optimized interdepartmental coordination. SMART Control represents a transformative approach to internal state financial oversight, shifting from follow-up to preventive control. Its integration into public finance management can strengthen fiscal discipline, improve resource allocation, and foster sustainable governance.

**Keywords:** Automated Data Generation System, Digitalization of State Financial Control, Preventive Control, SMART Control of Public Finances, Treasury of Russia.

*legal, mapeamento de riscos e o uso do rublo digital para o monitoramento orçamentário direcionado. O modelo permite a interação em tempo real entre os órgãos de controle e os participantes do orçamento, reduz a duplicação de processos e aumenta a confiabilidade dos dados. Os benefícios esperados incluem melhor detecção de irregularidades, redução dos riscos financeiros e otimização da coordenação interdepartamental. O SMART Control representa uma abordagem transformadora para a supervisão financeira interna do Estado, passando do controle de acompanhamento para o controle preventivo. Sua integração à gestão das finanças públicas pode fortalecer a disciplina fiscal, melhorar a alocação de recursos e promover a governança sustentável.*

**Palavras-chave:** Sistema Automatizado de Geração de Dados. Digitalização do Controle Financeiro Estatal. Controle Preventivo. Controle Inteligente das Finanças Públicas. Tesouro da Rússia.

## 1 INTRODUCTION

In modern conditions, improving the efficiency and quality of state financial control without using digitalization tools is practically impossible. In addition, modern technologies create conditions for comprehensive monitoring of control facilities, allowing for the transition from subsequent to preliminary control, which is the most effective and efficient way (Isaev 2022).

Currently, a departmental project of the Ministry of Finance of the Russian Federation and the Federal Treasury, Electronic SMART Control and Accounting of Public Finances for Management Decisions, is being implemented in the Russian Federation. The project's main objectives are to increase the transparency and validity of budget allocations, ensure the openness of the mechanism for calculating and accounting for allocation results, and prompt management decisions on implementing the federal budget. As part of the project, a unified electronic data generation system (the SFAD environment) for accounting and reporting public finances in the Russian Federation's budgetary system is planned to be created by 2027. Forming an integrated electronic SFAD environment will allow automated controlling, analysis, and accounting of public finances (Bryleva 2024).

The Electronic Budget State Integrated Information System (SIIS) is the basis for forming the electronic SFAD environment. It combines all the data, functions, and tasks related to the country's budget system.

Digitalization of state financial control is part of implementing the project. Digital technology control in the financial and budgetary sphere will increase transparency and accountability of financial transactions, optimize public finance management processes, reduce financial risks, ensure financial system stability, and improve interaction between financial control authorities and other participants in the budget process.

After conducting preliminary scientific research, we concluded that an effective tool for monitoring and managing public finances and the budget was necessary. We propose to create a new subsystem of the Electronic Budget SIIS, a SMART control system in the financial and budgetary sphere, as such a tool. In previous publications, we developed and described a comprehensive transformational model of internal state financial control, including the stages of implementation, tools, functional areas, their interaction, and interconnection in the functioning process (Safiullin *et al.* 2025). This paper aims to develop practical recommendations for implementing the previously proposed internal state SMART control model integrated into the digital public finance administration system.

Many researchers have recently focused on using digital technologies and their role in improving the efficiency of public administration. An analysis of about 100 scientific papers on the application of SMART technologies in the public sector led to the conclusion that most of them focus on digital management tools for smart cities (Goh *et al.* 2024; Prateppornnarong 2025; Shen *et al.* 2025; Zhang and Gao 2025). Some authors consider the problems and advantages of distributing blockchain technologies to implement digital transactions in smart contracts (Eze and Ameyaw 2025; Hejazi and Lashkari 2025). Others emphasize the importance of open big data analysis in increasing transparency and public confidence in government initiatives (Hartley and Aldag 2024; Yue *et al.* 2025). Digitalization of the public sector as a key factor in effective public administration is recognized by Febiri *et al.* (2024), Irani *et al.* (2023), and Scupola and Mergel (2022). We did not find any work on implementing SMART control models in the public administration's financial and budgetary sphere.

## **2 METHODS**

### **2.1 Conceptual approach**

When developing practical recommendations on implementing the internal state SMART control model in the financial and budgetary sphere, we considered the transformational processes in the Russian Federation's public administration as a result of the introduction of innovative tools, approaches, techniques, methods, and processes of control activities. Experts note that SMART control allows for operational digital monitoring of the state of control objects and processes, analyzing data, and making sound, reasoned decisions (Isaev and Romanov 2022).

### **2.2 Platform selection**

The SMART control model we proposed in the financial and budgetary sphere is a fully automated subsystem of the Electronic Budget SIIS. The Russian Federation's Unified Digital Platform, GosTech, recommended by the country's government for implementing measures to create, develop, and operate state information systems, has been proposed as the basis for development. The implementing platform complies with the confidentiality requirements for stored and accumulated information in government information systems. It allows for the integration of all existing and newly created information systems.

### **2.3 Implementation stage**

When developing practical recommendations for implementing the SMART control model in the financial and budgetary sphere, we considered the needs of the internal and external digital control environment, the sequence of stages of creating and developing a new information system, and the use of special tools that ensure effective coordination of actions and eliminate errors and duplication of work. The study of the main elements and their interaction within SMART control in the financial and budgetary sphere allowed us to develop practical recommendations that can serve as a starting point

for developing long-term plans and initiatives to create and improve a control model in these areas.

### 3 RESULTS

Control using digital technologies is still being developed, so we propose the following practical recommendations for its implementation.

#### **3.1 Recommendation 1. expanding the functionality of SMART control in the financial and budgetary sphere, including introducing unified forms of primary documents and other recommendations to participants in the budget process**

First, participants in the budget process need to keep records in electronic document management and carry out other iterations in digital form to implement a SMART control system in the financial and budgetary sphere. Therefore, creating and implementing unified forms of primary documents for all participants in the budget process is necessary. This will simplify and speed up the processes of control activities due to standard document management. In addition, it is worth paying attention to the quality management system for accounting data, operations, and business processes of participants in the budget process and focusing on improving the timeliness and reliability of the information provided for control in the financial and budgetary sphere.

When developing a SMART control system, it is necessary to understand that the digital environment constantly requires development and improvement. Therefore, the information system must be continuously developed to increase its data-centricity. Today's important task is to create a high-quality information base so that any participant can confidently own and use it.

SMART control in the financial and budgetary sphere can be considered a pool of information and analytical tools based on blockchain and big data, which extract valuable knowledge from large amounts of structured and unstructured data. Introducing these technologies into the SMART control system in the financial and budgetary sphere will allow the implementation of control measures and the conduct of analytical research,

prediction, and identification of risks based on big data using machine learning models (Volkova and Znovyuk 2024).

Institutions are encouraged to use new electronic forms in the inventory process, simplifying and speeding up control processes. In addition, the objects of control should pay attention and, if necessary, change the functionality of the relevant department responsible for accounting, primary documents, etc. This measure will help avoid duplication of work, simplify the activities of state financial control bodies, and allow for remote inspections.

### **3.2 Recommendation 2. preparation for an innovative form of control**

Based on Recommendation 1, one can build the following algorithm to prepare for the new system:

- Use electronic documents for accounting purposes.
- Track and write off debts promptly.
- Pay attention to inventory issues.

Allocating responsibilities rationally and considering job descriptions is recommended to avoid duplication of work functions. It is also necessary to pay attention to the issue of documentation turnover. It is recommended that the documentation turnover schedule be organized as a working document schedule. Any primary documents must be created and transmitted sequentially. In addition, it is recommended that the institution track its debt. The presence of accounts payable and accounts receivable is a reason for subsequent control measures. Following this algorithm will reduce the time of the control event and minimize the risks of detecting violations.

### **3.3 Recommendation 3. The legal basis for implementing SMART control in the financial and budgetary sphere**

At the legislative level, it is recommended that the Russian Federation's Budget Code be supplemented with a separate chapter that establishes provisions on SMART control in the financial and budgetary sphere. The substantive part of the chapter reveals the methodology of using SMART control in the financial and budgetary sphere in control

activities, namely procedures, techniques, and methods for achieving the tasks set, as well as provisions on norms and rules for the use, processing, and protection of information and other incoming data for control purposes. In addition, a rule is proposed for information interaction between bodies carrying out control activities and organizations providing information by providing documents and access to the requested data in their information systems.

### **3.4 Recommendation 4. fields for improving new control methods**

The transition of internal state financial control in the Russian Federation from follow-up to preventive control has led to introducing new control methods such as analysis, monitoring, and financial and budgetary monitoring.

The development of real-time information interaction between the facility and the control body is an important transition to a new level of information processing and, accordingly, should become a priority area for the development of SMART control in the financial and budgetary sphere, including through the prism of financial and budgetary monitoring. Based on this, it is recommended that the procedure for obtaining access by the control authorities to the control facilities' information systems be determined. It is assumed that, first, the controller should send a request for data on the access parameters of the internal state financial control body to the control object's information system (connection parameters; technical and information support from the control object; information about persons responsible for information interaction with the control body).

Based on the results of the review of the access parameters submitted by the control object, the control body must notify the control object of the possibility of connection or inability to connect to the information system no later than five working days from the date of receipt of the access parameters. The grounds for notifying an organization's control body about the impossibility of connecting to the organization's information system are the use of cryptographic protection of the communication channel that does not comply with the standards developed by the control bodies and incorrect indication of access parameters. The control object, within 30 working days from the date of receipt of the notification of the impossibility of connecting the control body to the

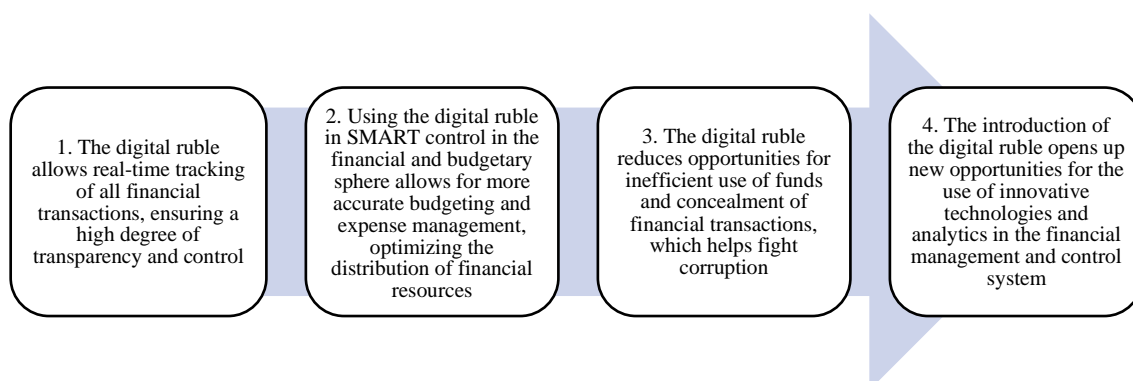
information system, makes appropriate changes or additions to the access parameters and sends them to the control body in electronic form via telecommunication channels.

### **3.5 Recommendation 5. the use of the digital ruble to control the use of budget funds**

The digital ruble is a digital form of the national currency issued by the Central Bank of the Russian Federation. It combines the properties of both cash and non-cash money. The mechanism for implementing digital rubles is unique digital tokens, i.e., codes. Tokens allow one to track cash flow chains, which increases transparency in this process. Each transaction is automatically recorded in databases and is easily accessible for reporting. Unlike cash or even electronic cashless transfers, which require third-party confirmation or complex control mechanisms, the digital ruble offers built-in monitoring mechanisms, facilitating the collection and generation of data for reporting. The digital currency is assumed to be used as part of targeted payments. This applies to social benefits, expenses for road repairs, and other monetary funds in digital terms. Each digital ruble can be programmed to be spent only on certain needs, which will help avoid the misuse of budget funds. Monitoring and administering digital currency requires significantly lower costs than controlling other forms of money. Based on this, we can talk about the possibility of actively introducing the digital ruble into the activities of all participants in the budget process for settlements to be administered by the control authorities. It is assumed that data on settlements in digital currency will be able to be automatically transferred to SMART control in the financial and budgetary sphere. This is an important step in increasing the efficiency and transparency of financial transactions and improving the management of public finances. The following characteristics can be identified among the advantages of using the digital ruble to control budget funds (Figure 1).

**Figure 1**

Advantages of using the digital ruble.



The introduction of the digital ruble will allow the subjects of control to monitor the use of budget funds online. In addition, the previously mentioned blockchain technology can be used for the digital ruble. Blockchain will ensure the safe and reliable storage and transmission of digital ruble data, minimizing the risks of cyberattacks and fraud.

### **3.6 Recommendation 6. a system for evaluating the effectiveness of the implementation and use of SMART control in the financial and budgetary sphere**

Introducing SMART control in the financial and budgetary sphere into the activities of participants in the budget process is a time-consuming stage, starting with material costs and ending with human resources. Certain constraints to the project's implementation exist, including the low qualifications of employees in the field of information technology and the lack of understanding among the control subjects regarding the application of new control methods (How will the control be used? What will be controlled? How often?, etc.). All this boils down to the main deterrent: the poor elaboration of regulatory and informative bases. In addition, it will take some time to implement since the control object needs to adapt to the new rules for interaction with control authorities, electronic document management, and work in a SMART control in the financial and budgetary sphere (Sergeev 2023).

Considering the effectiveness of this system, it is worth noting that the cost of creating and maintaining SMART control cannot exceed the effect of its use. In other words, implementing the system should not be unprofitable for the budget. For example, the cost of maintaining a control service before and after implementation, the complexity of control measures before and after implementation, satisfaction with the results of SMART control in the control objects, etc., can be used as performance indicators.

### **3.7 Recommendation 7. creation of a risk map (Register) for Implementing and using SMART control in the financial and budgetary sphere**

Unexpected risks may arise as part of implementing the SMART control system in the financial and budgetary sphere. Therefore, we identified the main categories of risks that should be considered and reflected in the map (register) of possible risks:

- 1) Legislative risks: legislation changes that may affect participants' activities in the budget process.
- 2) Technical risks: possible problems with integrating information systems, insufficient computer equipment performance or reliability, and difficulties in developing and implementing new technologies.
- 3) Personnel risks: lacking qualified employees who can work effectively with new technologies, employee training, and retraining may require additional costs and time.
- 4) Confidentiality and data security: the possibility of confidential information leakage, hacker or virus attacks, and unauthorized access to the system.
- 5) Financial risks: excessive expenditure of budget funds to implement SMART control in the financial and budgetary sphere due to unexpected costs or changes in requirements.
- 6) Budget risks: an increase in budget expenditure when the revenue is lower than expected.
- 7) Strategic risks: failure to achieve the set results and goals.
- 8) Business continuity risk: disruption of the continuous functioning of SMART control in the financial and budgetary sphere and other related information products.

## **4 DISCUSSION**

### **4.1 Transformation of public services**

Digitalization of public services involves not only the transformation of relations between public service providers and customers, but also the transformation of the work of the state apparatus (Andersson *et al.* 2022). Marchesani and Ceci (2025) share a similar opinion, considering the impact of internal and external factors on the digitalization of public services. In addition, they emphasize the possibility of continuous monitoring of processes in the digital transformation of public services and significant optimization of existing infrastructure. These findings are reflected in a new instrument of state financial control, financial and budgetary monitoring, proposed for implementation in the Russian Federation.

### **4.2 Artificial intelligence in public administration**

The transformational mechanisms of digitalization of public administration and the possibilities of using artificial intelligence are considered in their works by Ahn and Chen (2022). They emphasize the need to consider risks such as the level of qualifications of government employees in the field of AI and the ability of AI to make reasonable ethical decisions. We agree with their opinion that employees need to improve their skills in new digital technologies and that a culture of innovation in public administration must be formed.

### **4.3 Risks in digital transformation**

Bora (2025) shares a similar opinion, believing that integrating digital technologies does not increase the efficiency of public administration and largely depends on the availability of infrastructure, the digital literacy of employees, and the uninterrupted integration of systems. Bora also notes the emergence of new types of risks and obstacles in digitalization processes, which require careful consideration. Bora (2025) highlights the rigidity of the administrative structure, employee resistance, and

insufficient interagency cooperation as examples of such risks, which can slow down digital transformation. We agree with the conclusions that digital transformation efforts aimed solely at introducing technology without considering institutional readiness for change may not lead to significant improvements in governance. We considered these conclusions when developing practical Recommendation 4 regarding the possibility of using a new method of remote state financial control (financial and budgetary monitoring). Non-compliance of the control object's information systems with the standards developed by the control body may serve as a basis for notifying the organization about its inability to connect to its information system for monitoring purposes. We also considered the risks of the Russian Treasury authorities' activities (Fedchenko *et al.* 2023).

#### **4.4 Public service ecosystem approach**

Liu *et al.*'s (2025) approach is interesting. These authors explore the issues of digital integration of public services using the theory of the Public Service Ecosystem (PSE), a multi-level and constantly evolving system that considers the interests of many participants. Our practical recommendations are also based on the continuous development of the SMART control model.

In the context of the digital transformation of public administration in the Russian Federation, it seems necessary to introduce SMART control in the financial and budgetary sphere as a subsystem of the Electronic Budget SIIS. This process is multifactorial and requires close interdepartmental cooperation from state financial control bodies based on forming a unified structure for the electronic exchange of data and information between all subjects of the budgetary process, not only at the federal level but also in each region of the Russian Federation. A trend in this work is the introduction of machine learning models for analyzing big data, identifying patterns, and predicting the execution of budget procedures. This will automate control in this area, implement analytical access tools at the decision point, and integrate analytics into operational processes. The introduction of machine learning models into the activities of state financial control bodies requires changes to the staffing of public sector entities, such as attracting new specialists in the field of data science, such as data analysts, researchers, and engineers.

The practical recommendations presented in the study are designed to systematize the activities of control bodies and control facilities, promptly prevent and minimize the possibility of risks and violations, evaluate the effectiveness of the system, and ensure the implementation and functioning of SMART control in the financial and budgetary sphere.

## **5 CONCLUSION**

The results of the study showed that the implementation of the SMART control within the digital architecture of the state financial control can strengthen the foundations of sustainability governance in the Russian Federation. In addition, the creation of centralized electronic documentation, expanded automated analytical tools and machine learning algorithms for monitoring will make it possible to detect and neutralize risks at an early stage of their emergence in order to prevent systemic risks from forming. The digital ruble will help to achieve this through greater transaction transparency, controllability, and another tool for targeted budget execution.

However, the importance of updating institutional capacity (e.g. changing the law, coordinating across organizations, providing digital skills for the workforce) is also recognized. Remaining challenges are in the field of data security, interoperability (contact with other systems), human resources, and uncertainty about the legal framework. Overcoming these can ensure longevity.

To conclude, SMART control is one of a number of models for a more smooth and responsive financial control framework that seeks to consolidate information flows and support evidence-based decision-making. Its application to the Electronic Budget SIIS could improve fiscal discipline and confidence in public finances while reducing transaction costs for a more resilient model of public administration.

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### **Authors' Contribution**

All authors contributed equally to the development of this article.

### **Data availability**

All datasets relevant to this study's findings are fully available within the article.

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