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**PUBLIC AUDIT IN THE DIGITAL TRANSFORMATION OF  
SOCIETY**

V. N. Podoprigora (a), V.V. Zavadsky (b), A. O. Zhukov (c), I. N. Kartsan (d)\*

\*Corresponding author

(a) Plekhanov Russian University of Economics, Moscow, Russia, goramira@gmail.com

(b) Plekhanov Russian University of Economics, Moscow, Russia, vetal81@mail.ru

(c) Institute of Astronomy of the Russian Academy of Sciences, Moscow, Russia,  
FGBSI «The Federal Center of Analyzis», Moscow, Russia, Russian Technological University, Moscow, Russia,  
aozhukov@mail.ru

(d) Marine Hydrophysical Institute, Russian Academy of Sciences, Sevastopol, Russia,  
Reshetnev Siberian State University of Science and Technology, Krasnoyarsk, Russia, kartsan2003@mail.ru

**Abstract**

The article deals with the organization of state audit using digital technology. The concept of a digital register and digital platforms with a description of system and software solutions to ensure continuous auditing and on its basis adaptive management of public resources is proposed. With the use of audit data in the economic-mathematical balance model that characterizes the inter-industry production relationships in the economy of the country. The concept-based service proposed for real-time streaming and scalable data processing will enable continuous data collection and analysis from hundreds of thousands of sources for management systems, anomaly detection and dynamic pricing. Will ensure the involvement of all participants in the public resource management process in the service, with minimal use of administrative pressure. Makes it possible to switch to a system of continuous complex state audit without increasing the number of RF Audit Chamber staff. Using the service created for the purpose of government audit when developing strategies and programs for socio-economic development will allow to correlate national goals, goals of departments and strategic goal-setting documents with their resource provision.

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## 1. Introduction

The inseparability and interconnectedness of technological and social transformations have attracted the attention of researchers throughout human history and are used not only in the analysis and assessment of the changes that have occurred, but also as a tool for predicting future scenarios for the development of existing institutions and the emergence of new ones. Half a century of experience, from the first transcontinental exchange of information using computers, to social networks accessible to most of the world's population, has changed the landscape of social and political structures. The availability of information has become a key indicator of human rights and freedoms and has largely defined state-citizen relations. Digital technologies in the work of the subjects of public administration are changing not only the tools but also the functions and essence of public authorities. Information transparency in the activities of the state took one of the first lines in the list of criteria for the effectiveness of public administration. Ten years ago the reporting of governing bodies to citizens, built on annual or even electoral cycles, was perceived as the only possible solution. Today the absence of data of continuous monitoring of government efficiency is estimated by citizens as a desire of the bureaucracy to hide information. This shift in public consciousness and the availability of information gave rise to an entirely new social phenomenon, proactive civil control. Control is built on the principles of self-organization, has a stochastic nature and affects all spheres of circulation of budgetary resources. At the same time initiative civil control is often unsystematic and tendentious due to the lack of necessary knowledge and skills of those who carry it out. The results of the civil audit, clothed in viral content, attract the attention of millions and have a serious impact on the credibility of the government. The appeal of the population to the results of non-professional, sporadic audit in the absence of reliable and convincing sources containing real and timely information can have a destructive nature, both for individual citizens and for large groups and social strata, provoke processes of social frustration, accompanied by apathy and/or aggression. In these circumstances, the early transformation of public audit, its transfer to a continuous mode with the help of digital technology, in our opinion, is the only right solution.

## 2. Problem Statement

Digital audit has been occupying the minds of scientists and specialists in Russia and abroad for years. The increasing complexity of economic relations due to globalization leaves us no choice whether or not to use information and communication technologies (Kolchugin, 2018; Priobrazhenskaya, 2019). Leading audit companies successfully use system analysis, relying on software robots (bots) and artificial intelligence to automate business processes at enterprises. RPA (Robotic Process Automation) technology allows the exchange of information between different systems in automatic mode. Understanding and assessing the integrity of the data registry, opens up the possibility of detecting discrepancies and identifying risks in the management process (Alina et al., 2018; Frey & Osborne, 2013; Issa et al., 2016). Usually, this occurs as a result of the implementation of certain management decisions. Blockchain technology created for transparency and accountability of complex databases fits perfectly with the goals and objectives of auditing. Integration of these technologies into governmental activity, fully realizes the idea of responsibility for tax expenditure, income distribution and effectiveness of public administration

(Attaran & Gunasekaran, 2019; Baev et al., 2020). At the same time it would be a mistake to entrust any of the government structures or the government as a whole with the development of an integrative technological concept. Such work requires a body with the right, based on the law, of access to all databases related to public administration and interested in an objective assessment. In Russia this right belongs to the Audit Chamber of the Russian Federation. The Accounts Chamber in accordance with the Constitution of the Russian Federation controls the execution of the federal budget, participates in the implementation of the parliamentary control function, thus maintaining the transparency of the budget funds use. The mission of the Accounts Chamber is to promote fair and responsible public administration as a prerequisite for the sustainable development of Russian society and decent human life. Chairman of the Chamber Alexei Kudrin sees the future of the Accounts Chamber of the Russian Federation in the digital audit. In his statement to TASS on 02.08.2018 outlined a three-year deadline for the transition of the Accounts Chamber of Russia to a digital audit. The work has begun, at the end of 2018 launched an automated system "Unified Project Environment" for the collection, processing and accumulation of data. Since 2019, the practice of using digital tools and analytical data showcases for data visualization and analysis is being introduced (Boskou et al., 2018; Kokina & Davenport, 2017; Odintsova & Rura, 2018). At the same time, there is a digital transformation of the procedures for preparing and presenting reports. For example, nearly 50 percent of the content of some facilities' financial audit analytical notes is now generated automatically, thanks to downloadable data.

Thus, a comprehensive approach to the trivial task of public auditing, based on proven digital technologies, can solve a number of tasks that public administrations are working on within adopted strategies at the lowest possible cost and in the shortest possible time. Some commercial companies have been using a single resource management information system for quite some time, offering its own functionality, created for their personal needs and requirements, and allowing them to solve all of their tasks in several disparate systems at once.

### **3. Research Questions**

The following questions were raised during the study:

- What is the opportunity for digital technology in public auditing tasks?
- To what extent do auditing companies use software robots and artificial intelligence?
- What is the proposed concept for digital public auditing?
- What risks are present with the proposed concept?

### **4. Purpose of the Study**

It is assumed that the answers to the above questions will help to achieve the goal and make possible the transition to a system of continuous comprehensive state audit, without increasing the number of staff of the Accounts Chamber of the Russian Federation. Using the service created for the purpose of government audit when developing strategies and programs for socio-economic development will allow to correlate national objectives, objectives of departments and documents of strategic goal setting with their

resource provision. In fact, the economic-mathematical balance model characterizing inter-branch production interrelations in the country's economy will be revived in public administration.

## 5. Research Methods

As technological solutions, the concept provides for the creation of a digital register, digital platforms, intelligent automation, automatic preparation and reconciliation of data sets, automated continuous control of management processes, process robotization, machine learning, smart chatbots and real-time analytics.

The concept incorporates many features:

- real-time revenue and expense forecasting;
- transaction record checking and instant auditing;
- transparency and responsiveness of the budget process and government procurement;
- analysis and evaluation of budget management;
- automatic execution of secure budget decisions;
- risk management;
- ensuring information security.

These tasks, in our opinion, should be solved in the structure of the digital register. All the remaining tasks are proposed to be solved on the basis of two digital platforms: the platform of state audit and the platform of prices and tariffs. By giving them the following management functions:

- a continuous process of analytical evaluation of control actions;
- the correction of decisions taken in the light of real data on the results of management;
- the formation of a systematic and up-to-date regime of staff training;
- prevention of gross errors and abuses;
- comprehensiveness and connectivity of decisions made at different budget levels.

At the same time necessarily maintaining a unified system and program approach in the register and platforms, allowing without violating the security requirements established by law to each of the above areas to organize their interaction.

The lack of economically sound principles and mechanisms for decision-making and subsequent evaluation of the consequences of their implementation in the management of state resources is often due to the distortion of baseline data in the strategy of the federal executive bodies. In order to ensure the reliability of data in an increasingly complex environment, it is necessary to continuously monitor (in 24x365 mode), events data, logs, revenues and expenditures, the profitability of total assets, tariffs and prices. As the data is accumulated, through approximation and granulation, the accuracy of information for the purposes of public resource management will continuously increase. However, in our opinion, these solutions are necessary, but not sufficient. In addition to them, at the software level, we should robotize the reconciliation:

- reliability of the data underlying the formation of the tariff and price;
- reliability of data on the financial and economic activities of organizations with state participation;
- Comparability of the results of activities of organizations with state participation;
- Justification of public procurement costs;
- justification of price and tariff disproportions in regions and industries;
- transparency of procurement transactions at electronic bidding;
- continuous control of spending of budgetary funds and revenues of the federal budget;
- continuous monitoring of the economic activities of structures with state participation.

The concept provides for the use of distributed registry technology. In our opinion, such advantages of blockchain as transparency, high data quality, durability, reliability, process integrity, stability and absence of a single point of failure (decentralization) will help ensure timely detection of dishonest transactions and prevent their implementation with the help of smart contracts. As well as to fully restore the trust of citizens in the governing bodies.

Any managing impact makes sense if it is based on complete and reliable information. Obtaining accurate baseline data is possible and economically feasible, when using information and communication technologies that support:

- real-time operation;
- reliability and security of data transmission, storage and processing;
- friendly interfaces that ensure ease of use;
- elasticity in dynamically scaling applications and regulating the flow capacity;
- primary data preparation in an external environment;
- mobile application data capture.

The next step, after collecting the necessary data, is to structure, analyze and evaluate it. The analytical functions of the platforms are designed to provide software solutions providing:

- automatic collection and processing of primary log and event data;
- metadata generation algorithms;
- algorithms for controlling deviations from the indicators established by regulatory documents;
- algorithms for making standard decisions;
- algorithms for the formation of data to justify the regulator's corrective actions.

Since the tariff policy is the cornerstone of public administration of the economy, the digital platform of prices and tariffs, should be equipped with a decision support system based on predictive and prescriptive analytics. It should also include management of: master data, decision lifecycle, resource planning, relationships and risks.

## 6. Findings

The key idea of the concept is to give the control function of the Accounts Chamber of Russia, the possibility of adaptive management of public resources, in all their diversity. As conceived by the developers, created on the basis of the concept service for streaming data transmission and processing in real time with scalability will allow for continuous collection and analysis of data from hundreds of thousands of sources for management systems, anomaly detection and dynamic pricing. Will ensure the involvement of all participants in the public resource management process in the service, with minimal use of administrative pressure. Makes it possible to switch to a system of continuous complex state audit without increasing the number of RF Audit Chamber staff. Using the service created for the purpose of government audit when developing strategies and programs for socio-economic development will allow to correlate national objectives, departmental goals and strategic goal-setting documents with their resource endowment. In fact, the economic and mathematical balance model characterizing inter-branch production relations in the national economy will be revived in public administration.

Access to primary data and a complete picture of all transactions will provide real-time auditing of routine transactions, timely detection of fraudulent actions and automation of procedures for testing assets, liabilities, capital and smart contracts using blockchain technology.

To ensure trust and security, the following solutions are proposed: open code, distributed registry, trust protocol, cryptographic processing, timestamping of source data and data access protocol within established competence.

## 7. Conclusion

Of course, like any other project, our concept does not exclude risks, limitations and assumptions, among which we see:

- lack of proper coordination of information support for credible problem assessment;
- resistance to change and disclosure by the leadership of government agencies;
- provision of incorrect and incomplete information on financial and economic activities to government information systems;
- the desire of individual experts with broad powers to ensure their dominance;
- insufficient competence of executors.

Taking into account the above limitations, assumptions and risks, the development of the concept began with extensive consultations with the Accounts Chamber of Russia and propose to organize interagency and interdisciplinary cooperation under the tasks of public audit, with the finalization and practical implementation of the concept within three years established by the leadership of the Accounts Chamber of Russia in 2018. Open process of cooperation and open program solutions will allow to involve in the implementation of the concept a wide range of stakeholders from all spheres of economy, management and science.

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## References

- Alina, C. M., Cerasela, S. E., & Gabriela, G. (2018). Internal audit role in artificial intelligence. *Ovidius University, Economic Sciences Series*, 18(1), 441-445.
- Attaran, M., & Gunasekaran, A. (2019). Blockchain principles, qualities, and business applications. Applications of blockchain technology in business. *Bakersfield*. California State University.
- Baev, A. A., Levina, V. S., Reut, A. V., Svidler, A. A., Kharitonov, I. A., & Grigoriev, V. V. (2020). Blockchain technology in accounting and auditing. *Uchet. Analiz. Audit [Accounting. Analysis. Auditing]*, 7(1), 69-79.
- Boskou, G., Kirkos, E., & Spathis, C. (2018). Assessing internal audit with text mining. *Journal of Information & Knowledge Management*, 17(02), 1850020.
- Frey, C. B., & Osborne, M. A. (2013). The Future of Employment: How Susceptible are Jobs to Computerisation? *Technological Forecasting and Social Change*, 114(C), 254- 280.
- Issa, H., Sun, T., & Vasarhelyi, M. A. (2016). Research Ideas for Artificial Intelligence in Auditing: The Formalization of Audit and Workforce Supplementation. *Journal of Emerging Technologies in Accounting*, 13(2), 1-20.
- Kokina, J., & Davenport, T. H. (2017). The emergence of artificial intelligence: How automation is changing auditing. *Journal of Emerging Technologies in Accounting*, 14(1), 115-122.
- Kolchugin, V. V. (2018). Two key tasks of accounting. *Uchet. Analiz. Audit [Accounting. Analysis. Auditing]*, 5(3), 30-39.
- Odintsova, T. A., & Rura, O. V. (2018). Transformation of accounting in the digital economy and information society. *Formirovanie tsifrovoi ekonomiki i promyshlennosti: novye vyzovy [Shaping the Digital Economy and Industry: New Challenges]*, 6, 41-61.
- Priobrazhenskaya, V. V. (2019). The impact of digital economy on accounting competencies development. *Financial journal*, 5, 50-63.