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THE IMPACT OF DIGITAL TECHNOLOGIES ON THE ORGANISATION OF PERFORMANCE AUDITS OF STATE PROGRAMMES

Abstract: *The paper examines the impact of digital technologies on the organisation of performance audits of government programmes. Digital technologies provide ample opportunities for transforming public administration, with each new stage of their development. The magnitude of changes associated with the transition to digital government has prompted many to think and think about «digital era public administration» as a core concept in public administration, evolving largely in a digital transformation. The purpose of the study is to examine new digital trends and the impact of digital technology on the organisation of performance audits of government programmes.*

Using general scientific methods of knowledge (analysis, synthesis, induction, deduction, method of comparison), the impact of digital technologies on the organisation of the audit of the effectiveness of the implementation of state programmes is considered.

In the course of the study, the authors propose the use of «breakthrough» digital technologies that facilitate the implementation of results-based management principles, which will save budgetary resources, increase efficiency in their use, and broaden the list of strategic objectives pursued by the public authorities.

The study determined that the introduction of digital technology could contribute to a significant reduction in the cost of maintaining apparatuses. With the active deployment of artificial intelligence and automated decision-making technologies, governments could expect between and 30 percent time savings within five to seven years. The results of the analysis show that the active use of digital technologies implies the expansion of methods for analysing and evaluating the implementation of government programmes, including as part of performance and efficiency audits of their implementation.

It is concluded that the application of digital technologies can be an «engine» for further implementation of public administration by results. To this end, the development of new government information systems must consider the benefits of 'breakthrough' digital technologies as much as possible.

Keywords: *Digital technologies, performance audit, state programmes, digital age, information and communication technologies.*

■ Introduction

The widespread and continuous development of information and communication technology has a significant impact on all areas of public relations, including the organisation of performance audits of government programmes.

In this context, the importance of digital transformation as a set of changes in society related to the introduction, and assimilation of modern digital technologies has gained prominence.

Digital technologies provide a wide range of opportunities for transforming public administration, and at each new stage of their development («digitisation» of processes, e-government, digital government) significant changes occur both in the use of certain technologies and the organisation

of public authorities' activities, in the interaction between citizens and public authorities. If at the first stage information technology is, in fact, a tool for the implementation of certain public administration reforms, at the stage of digital transformation digital technology is integrated into the policy-making process, creating opportunities for the implementation of various public policy options that cannot be implemented without the use of technology [1].

■ Literature review

While in earlier stages, technology allowed for optimization and automation of existing administrative procedures, in the phase of digital government, technology is seen as an opportunity to implement services, to create benefits, and adapted in composition and delivery to the individual needs of citizens, which improves the quality of public services and public goods (Bannister & Connolly, 2014) [2]. States are moving from improving internal administrative processes to transforming them in a meaningful way, including through the introduction of interagency, «platform» solutions for public service delivery, control, and oversight functions (Janssen & Estevez, 2013) [3].

In foreign and domestic literature, digital transformation is viewed primarily from the perspective of transforming the processes of public service delivery (Lindgren & van Veenstra, 2018; Petrov et al., 2018) [4], but the possibilities of using digital technologies for other types of public functions and public administration purposes proper, including the definition, planning, monitoring, and evaluation of managerial decisions and public policies, are not considered.

The magnitude of changes associated with the transition to digital government has prompted some researchers to speak of 'digital public management' as a core concept in public management, evolving largely in opposition to the widely criticised concept of 'new public management' (Dunleavy et al., 2006) [5].

This approach implies government flexibility, the use of platform-based approaches to organizing activities, and the involvement of citizens and organizations in the joint delivery of services (Janssen & Estevez, 2013). The British scholars Margetts & Dunleavy distinguish two stages in the development of «digital public governance» and largely contrast the characteristics inherent in the concept of new public governance with the key features of «digital public governance» in the first and second waves (Margetts & Dunleavy, 2013) [6].

The first wave of «digital public administration» is seen as the formation of «e-government». The authors associate the beginning of the second wave with the spread of Internet-based technologies.

In the e-government phase, the role of adapting public services to the needs of individual citizens (groups of citizens) is increasing in evaluating the performance of public administration. Finally, the stage of digital government emphasises the quality of governance, openness, transparency, quality of interaction, and trust in government (OECD, 2016) [7].

■ Materials and methods

The potential of modern digital technologies suggests possible directions for their use in the cycle of effective public administration. For example, at the selection stage, «Big Data» analysis technologies, including those related to the use of artificial intelligence and predictive analytics technologies, are among the most in-demand technologies.

■ Results and discussion

The potential of modern digital technologies suggests possible directions for their use in the cycle of effective public administration. For example, at the selection stage, «Big Data» analysis technologies, including those related to the use of artificial intelligence and predictive analytics technologies, are among the most in-demand technologies.

The technologies demanded at the planning stage of government activities depend on the planning horizon. For strategic planning purposes, it seems appropriate to use Big Data-based

analytics, including retrospective analytics that allows for a comprehensive assessment of the situation in the area of governance and forecasting options for its change. In the case of tactical planning and real-time decision-making, artificial intelligence and IT technologies may be in demand, allowing a considerable number of performance parameters to be monitored in real-time and timely decisions on their correction to be made.

In the monitoring phase of IT and Big Data, the platform solutions used to deliver public services provide ground-breaking and independent data on the performance of programmes, public authorities, and, in some cases, individual employees. For example, online cash register data can be used to track consumer prices; online information can be used to assess the labour market; traffic camera data can be used to assess tourist flows; and GIS data can be used to assess international trade. Finally, in the performance assessment and adjustment phase, there seems to be a need for artificial intelligence, methods related to the implementation of «evidence-based» policies.

The introduction of digital technology could contribute to significant reductions in the cost of apparatuses. By actively introducing artificial intelligence and automated decision-making technologies, governments could expect to save between 27 and 30 percent of their time over a period of five to seven years. The importance of considering the financial component of digitalization is also reflected in the introduction of a new tool for results-based management, involving financial and economic justification of the feasibility of ICT projects - the business case [8].

Thus, the implementation of digital government has a positive impact on balancing the interests of all stakeholders, balancing expected and available resources, and balancing 'proactive' and 'reactive' approaches to public policy (Table 1).

The success of implementing public administration by results in the digital era largely depends on the extent to which the digitalisation of the management cycle for decision-making is synchronised with the digitalisation of the data collection and processing cycle, the expansion of the sources of data used on the performance and efficiency of public authorities and the methods for processing and analysing this data.

Table 1. Assessment of the impact of digital technology on compliance with the principles of public administration (performance-based auditing)

The principle of governance by results	Assessing the impact of digital technology on compliance
Balancing the interests of all stakeholders	Digital technologies create the conditions for greater compliance with this principle, including in the planning, monitoring, and evaluation of public policy outcomes, creating new forms of data collection and processing that reflect the interests of all stakeholders, including passive data collection (through social media analysis, search engines)
Balancing the interests of present and future generations	The introduction of digital technologies is generally neutral with respect to the implementation of this principle (digital technologies can be used both for research into problems of a strategic nature and for tactical tasks)
Balancing expected results with available resources	Digital government technologies, in general have a positive impact on compliance with this principle, both by introducing specific ICT project justification tools (business cases) and by collecting and analysing detailed information on the transaction costs of public authorities and, therefore, the possibilities of optimising these costs
«Balancing initiative and assessment of achievements»: combining «proactive» and «reactive» approaches	In general, digital technologies enable the better realisation of this principle, including by providing tools for early detection of problems (as well as using artificial intelligence and big data processing) and proactive solutions

The principle of governance by results	Assessing the impact of digital technology on compliance
«Balancing personal responsibility for results and freedom of administration»	The use of digital technologies enhances accountability for results by expanding the sources of data that can be used for monitoring and evaluation
Source: Compiled by the authors	

The analysis shows that the increased use of digital technologies in public administration can further the uptake of the principles of results-based management in public administration.

In light of the review presented, the following areas seem to be the most promising for this development.

Firstly, more active use of Big Data is needed for official statistics, including for monitoring and evaluating the implementation of public programmes, as well as for auditing the efficiency and effectiveness of public spending.

Such projects can also expand the use of online surveys, including the use of social media, the use of online cash register data, and the use of spatial data for timely and independent evaluation of the results achieved. Although, due to the novelty and pilot nature of most Big Data projects, these data do not yet play a meaningful role in planning, monitoring and evaluating results, they are still a promising alternative to both traditional statistical surveys and, in some cases, administrative agency information.

The second key area is the introduction of machine-to-machine mechanisms for reporting and statistical data generation. The transition to «automatic» reporting based on the interaction of information systems of the reporting persons and information systems of the agencies will significantly reduce administrative costs in the economy and increase the reliability of the data on which decisions are based, and therefore of the decisions themselves.

In addressing the problem of fragmentation of departmental results-based management systems focused on individual instruments (e.g., state programmes or national projects), a promising direction is the development of platform solutions in the field of results-based management. This measure will, on the one hand, reduce labour costs related to the formation of reporting and monitoring of the results achieved, on the other hand, eliminate inconsistencies in various forms of departmental reporting.

The active use of digital technologies also implies the expansion of methods for analysing and evaluating the implementation of state programmes, including audits of the efficiency and effectiveness of their implementation.

The use of Big Data containing financial information about the costs of providing public services, on the one hand, and the volume of services provided, on the other, makes it possible to calculate the current level of transaction costs for the government and, accordingly, to take into account the need to reduce the level of transaction costs when re-engineering administrative procedures, introducing modern ICT technologies and promoting electronic channels for public services.

OECD monitoring of the implementation of this recommendation showed that the business cases have not been implemented in all member countries, but the practice is gradually spreading.

It should also be noted that a successful digital transformation of public administration by results requires the gradual removal of legal and technical constraints on the use of digital technologies in public administration, considering the minimisation of risks of using individual technologies (Figure 1).

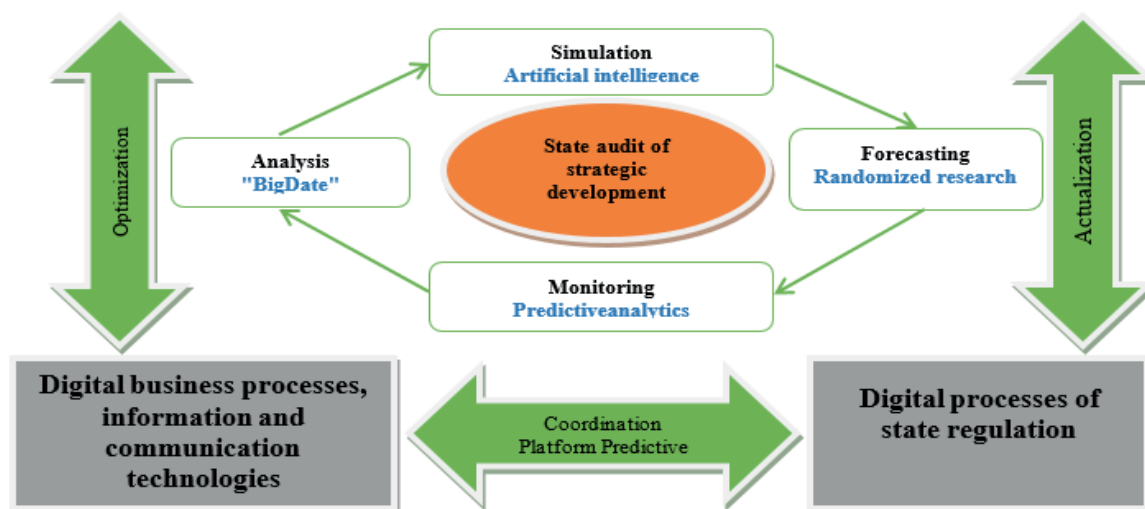


Figure 1. The place of public performance audits in the context of elements of the digital economy

Source: Compiled from source [9]

Thus, greater use of 'breakthrough' digital technologies in public authorities at all stages of the management cycle will broaden the range of data sources used on the results achieved, increase the speed of obtaining such data, and use better tools to analyse the actual impact of public policy implementation, the implementation of certain state programmes on different target groups.

The ability to use operational outcome data will improve the validity and quality of decisions based on it; some of these decisions could potentially be made autonomously. Digitally enabled, timely, and detailed data on the resources spent on public functions and individual processes will provide adequate tools for assessing efficiency and optimising budget expenditure.

The use of various sources of data on results will help improve the reliability and validity of information for management decisions. The use of 'breakthrough' digital technologies supports the implementation of results-based management principles.

Modernising the audit tools for state programmes will save budgetary resources, increase efficiency in their use, and broaden the list of strategic objectives to be pursued by the public authorities (Figure 2).

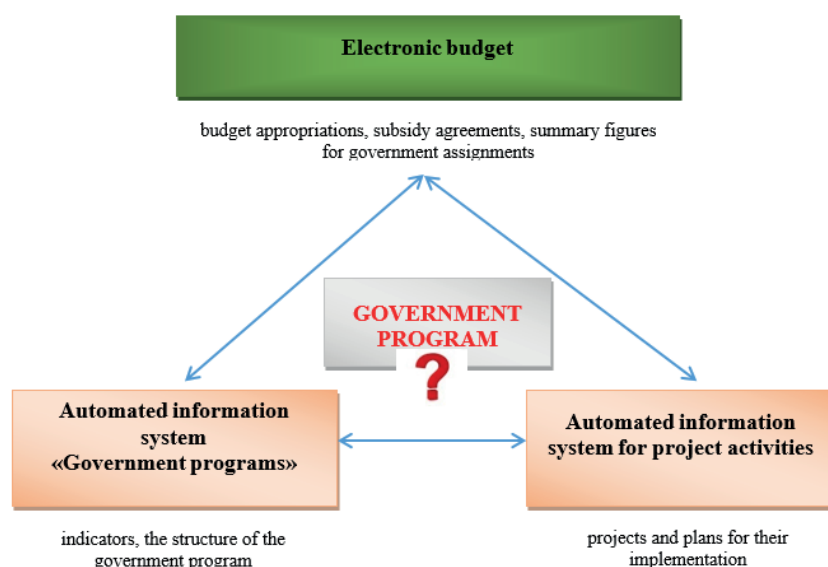


Figure 2. Creating a single information resource

Source: Compiled by the author

Among the areas for further improvement of the information and analytical support of the state audit of state programmes are the following:

- shifting the focus from follow-up to pre-monitoring;
- organising budget monitoring on a regular basis;
- the transition to a risk-based approach in the planning and execution of auditing activities;
- the introduction of a classifier of violations in the area of budgetary relations with regard to the implementation of state programmes;
- improving the system of sanctions for financial and budgetary irregularities, taking into account the existence and extent of the damage.

The effectiveness of the state programme should be assessed by following criteria:

- the level of cash execution of the SE to the unrestricted and amended budget estimates; – the level of fulfilment of all indicators of the SE and its constituent subprogrammes and FTPs;
- the level of implementation of the milestone events on the detailed timetable plans;
- the increase in receivables during the reporting period;
- increase in construction in progress during the reporting period.

The indicators and criteria for evaluating the effectiveness of the programme are presented in Table 2.

Table 2. Indicators and criteria for evaluating the effectiveness of the state programme

Indicators	High effectiveness	Medium effectiveness	Low effectiveness
Implementation rate of GPs in relation to planned expenditure	98,1-100%	85,1-98%	less than 85%
Level of achievement of all indicators – GPs	95,1-100%	85,1-95%	less than 85%
Level of achievement of milestone events on detailed timetable plans	95,1-100%	85,1-95%	less than 85%
Increase in receivables during the reporting period	not available	up to 10% costs	over 10% costs
Increase in work in progress for the reporting period	not available	up to 10% costs	over 10% of costs

Source: Systematised by the author

A state programme shall be characterised by an elevated level of effectiveness if all indicators meet the criteria of high effectiveness of the state programme. If at least one indicator falls under the medium effectiveness criteria (the remaining indicators meet the high or medium effectiveness criteria), then the effectiveness of the state programme will be considered as «medium». The evaluation of the state programme's effectiveness will be considered low, if at least one indicator meets the criteria of low effectiveness.

According to Government Resolution No. 1050 of 31 December 2019, funding from the national budget of KZT 780.8 billion is envisaged for the implementation of the SPIIR for the six-year period (Table 3).

Table 3. Volumes of Programme funding million tenge

Years	2020	2021	2022	2023	2024	2025	Total
RB	14665,3	215725,1	107896,4	107 863,5	101996,9	101249,9	780 97,1
Total	146065,3	215 725,1	107 896,4	107 863,5	101 996,9	101 249,9	780797,1

Source: Compiled from source [9]

In 2020, 152,970.5 million tenge was allocated from the national budget and 66.6 million tenge from the local budget. Of this amount 152,968 mln tenge (99.9%) and 66.6 mln tenge (100%) have been implemented, respectively. Undisbursed amounted to KZT2.5 mln.

The audit of the 2015-2019 SIPR assessment noted that while the stated requirement of KZT1.3 trillion, KZT765.4 billion or 57 percent was actually allocated.

The above trend is also maintained in the current SPID 2020-2025, where, with a declared KZT1.6 trillion, expenditures of KZT780.8 billion were supported. The financing plan for the Programme for 2020 provides for KZT 152.9 billion, with the Budget Commission approving KZT 146.1 billion.

Of all the GPIIR activities, 15% had a direct impact on achieving its goals and objectives, while the remaining 85% had an indirect impact on industrial-innovative development.

Provided that for the target indicators, the reported actual values do not exceed 10%, the state programme is not subject to performance evaluation.

An important measure to improve the information and analytical support of the state audit of state programmes should be the introduction of the risk-based approach into the audit practice. This approach represents a transition to a system in which the intensity of control depends on the level of danger, the level of possible damage that can be caused to the life and health of citizens, the environment, national security, state property as a result of violations of mandatory requirements at the controlled facilities. The general scheme of the risk-based approach is shown in Figure 3.

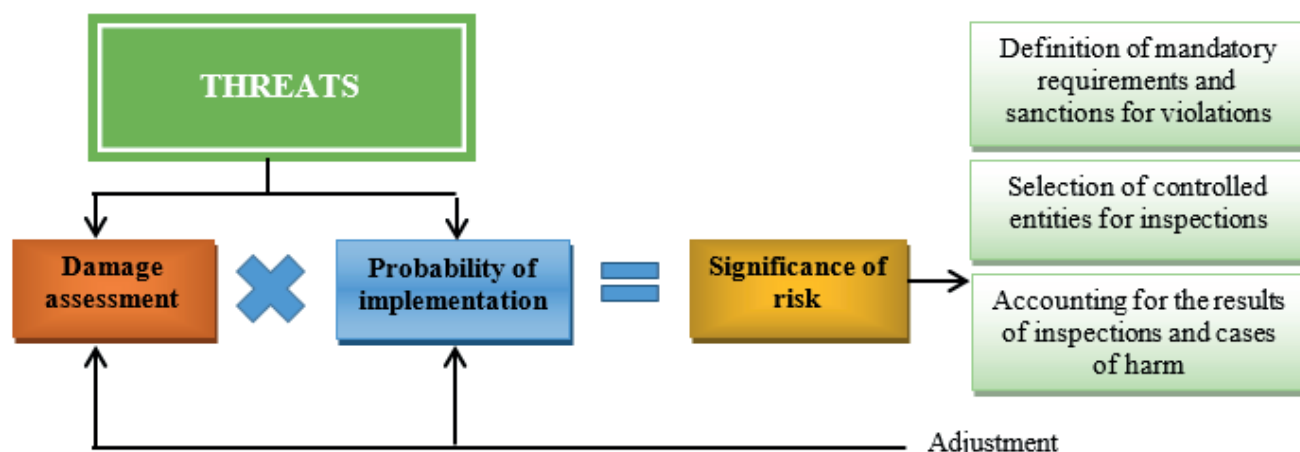


Figure 3. Model of the risk-based approach

Source: Compiled by the author

The introduction of the risk-based approach in the implementation of the state audit of state programmes should pursue two main objectives: increasing the efficiency of control and oversight activities and the feasibility of the implementation of state programmes. In accordance with the available international experience for the implementation of the risk-based approach in Russia, legal and organisational tools should be created to ensure:

- A risk assessment consisting of hazard identification, hazard characterisation and impact assessment;
- Risk management, which refers to the implementation of actions aimed at minimising or eliminating risks;
- disclosure of risks and how to address them. In addition, modern information technology has a key role to play in the implementation of risk-based approaches [10].

■ Conclusion

In the near future, the digital economy with the application of digital technologies may become a new tool that will open up wide opportunities for all spheres of life, including science

(as fundamental and applied). Therefore, it is very important to understand how to digitalize various structural elements.

A successful state on the one hand must be able to correctly implement technological innovations for citizens, non-profit organizations and businesses, and on the other hand, it should create favourable conditions for the development of innovation. Everyone understands that it is difficult to achieve digital transformation in the conditions out dated approaches and the creation of information systems that duplicate each other.

Thus, the application of digital technologies can be an «engine» for further implementation of public administration by results. To this end, the development of new government information systems must consider the benefits of «breakthrough» digital technologies as much as possible. In particular, it seems important to:

- Provide for the possibility of using different data sources to develop indicators for state programmes, national, federal and departmental projects and other strategic documents when monitoring, and evaluating their implementation;
- To exclude in the design of performance management information systems manual input of any data that can be derived from primary accounting forms, official statistical data, administrative data of authorities, other sources of «big data», including the use of the «Internet of things»;
- Enable the use of artificial intelligence technologies when analysing data on the planned and actually achieved results of public authorities, state programmes and state civil servants;
- Provide for the use of distributed registry technologies to avoid misreporting by public authorities.

To sum up, the implementation of these recommendations will contribute to improving the quality of domestic public administration, above all its efficiency and effectiveness. Specific areas of application of «breakthrough» digital technologies and their applications at various stages of the governance cycle could be an important subject for further research.

The introduction of digital technologies in public administration is aimed at providing citizens and organizations with access to priority government services in digital form, creating a national data management system, developing e-government infrastructure (“Smart government”), using end-to-end platform solutions in government management.

Digital technologies in the so-called “new public management” make it possible to effectively make decisions, develop digital administrative codes and machine-readable laws, and build communities of government IT developers.

The development and development of digital technologies are associated with the possibility of achieving the key goals of socio-economic development of Kazakhstan. In order to achieve these goals, special attention should be paid to the digitalization of public administration.

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ВЛИЯНИЕ ЦИФРОВЫХ ТЕХНОЛОГИЙ НА ОРГАНИЗАЦИЮ АУДИТА ЭФФЕКТИВНОСТИ ГОСУДАРСТВЕННЫХ ПРОГРАММ

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Аннотация. В статье рассматривается влияние цифровых технологий на организацию аудита эффективности реализации государственных программ. Цифровые технологии предоставляют множество возможностей для трансформации государственного управления, находясь на каждом новом этапе своего развития. Масштаб изменений, связанных с переходом к цифровому правительству, побуждает многих задуматься о «государственном управлении цифровой эры» как основной концепции в государственном управлении, развивающейся во многом в условиях цифровой трансформации. Цель исследования – рассмотреть последние тенденции в области цифровых технологий и влияние цифровых технологий на организацию аудита эффективности государственных программ.

С помощью общенаучных методов познания (анализ, синтез, индукция, дедукция, метод сравнения) рассмотрено влияние цифровых технологий на организацию аудита эффективности реализации государственных программ.

В ходе исследования авторы предлагают использовать «прорывные» цифровые технологии, способствующие реализации принципов управления, ориентированного на результат, что позволит экономить бюджетные ресурсы, повысит эффективность их использования и приведет к расширению перечня стратегических задач, решаемых государственными органами власти. При активном внедрении технологий искусственного интеллекта и автоматизированного принятия решений государства могли бы рассчитывать на экономию времени от 27 до 30% в течение пяти-семи лет.

Результаты анализа показали, что активное использование цифровых технологий предполагает расширение методов анализа и оценки реализации государственных программ, в том числе в рамках аудита результативности и действенности их реализации.

Сделан вывод о том, что использование цифровых технологий может стать «локомотивом» дальнейшего внедрения государственного управления по результатам. Для этого важно, чтобы при разработке новых государственных информационных систем максимально учитывались преимущества «прорывных» цифровых технологий.

Ключевые слова: цифровые технологии, аудит эффективности, государственные программы, цифровая эра, информационно-коммуникационные технологии.

МЕМЛЕКЕТТІК БАҒДАРЛАМАЛАРДЫҢ ТИІМДІЛІГІНЕ АУДИТТІ ҰЙЫМДАСТЫРУҒА ЦИФРЛЫҚ ТЕХНОЛОГИЯЛАРДЫҢ ӘСЕРІ

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Аңдатпа. Мақалада цифрлық технологиялардың мемлекеттік бағдарламаларды іске асыру тиімділігінің аудитін ұйымдастыруға әсері қарастырылады. Цифрлық технологиялар өзінің дамуының әрбір жаңа кезеңінде бола отырып, мемлекеттік басқаруды өзгертуге көптеген мүмкіндіктер береді. Цифрлық Үкіметке көшуге байланысты өзгерістердің ауқымы көптеген адамдарды цифрлық трансформация жағдайында дамып келе жатқан мемлекеттік басқарудағы негізгі тұжырымдама ретінде «цифрлық дәуірдің мемлекеттік басқаруы» туралы ойлауға итермелейді. Зерттеудің мақсаты-цифрлық технологиялардың соңғы тенденцияларын және цифрлық технологиялардың мемлекеттік бағдарламалардың тиімділігіне аудитті ұйымдастыруға әсерін қарастыру.

Танымның жалпы ғылыми әдістерінің көмегімен (талдау, синтез, индукция, дедукция, салыстыру әдісі) цифрлық технологиялардың мемлекеттік бағдарламаларды іске асыру тиімділігінің аудитін ұйымдастыруға әсері қарастырылды.

Зерттеу барысында авторлар нәтижеге бағдарланған басқару қағидаттарын іске асыруға ықпал ететін «серпінді» цифрлық технологияларды пайдалануды ұсынады, бұл бюджеттік ресурстарды үнемдеуге, оларды пайдалану тиімділігін арттыруға және мемлекеттік органдар шешетін стратегиялық міндеттер тізбесін кеңейтуге мүмкіндік береді.

Зерттеу нәтижелері бойынша цифрлық технологияларды енгізу құрылғыларға техникалық қызмет көрсету шығындарының айтарлықтай төмендеуіне ықпал ететіні анықталды. Жасанды интеллект технологияларын және автоматтандырылған шешімдер қабылдауды белсенді енгізу кезінде мемлекеттер бес-жеті жыл ішінде 27-ден 30% - ға дейінгі уақытты үнемдеуге сене алады. Талдау нәтижелері цифрлық технологияларды белсенді пайдалану мемлекеттік бағдарламалардың іске асырылуын талдау және бағалау әдістерін кеңейтуді, оның ішінде оларды іске асырудың нәтижелілігі мен тиімділігін аудит шеңберінде кеңейтуді көздейтінін көрсетті.

Цифрлық технологияларды пайдалану нәтижелері бойынша мемлекеттік басқаруды одан әрі енгізудің «локомотиві» болуы мүмкін деген қорытындыға келді. Ол үшін жаңа мемлекеттік ақпараттық жүйелерді әзірлеу кезінде «серпінді» цифрлық технологиялардың артықшылықтары барынша ескерілуі маңызды.

Түйін сөздер: цифрлық технологиялар, тиімділік аудиті, мемлекеттік бағдарламалар, цифрлық дәуір, ақпараттық-коммуникациялық технологиялар.