ISSN 1648-2603 (print)
ISSN 2029-2872 (online)

VIEŠOJI POLITIKA IR ADMINISTRAVIMAS
PUBLIC POLICY AND ADMINISTRATION
2024, T 23, Nr. 1 / 2024, Vol. 23, Nr. 1

ENHANCEMENT OF PERFORMANCE AUDIT FOR EFFECTIVE BUDGET INVESTMENTS

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https://doi.org/10.5755/j01.ppaa.23.1.33809

Abstract. *The relevance of the study is due to the need to improve the efficiency of budget investments in the Republic of Kazakhstan. Performance audits of the use of these investments will reveal opportunities to optimize expenditures and increase the overall socio-economic impact, which is significant for the sustainable development of the country. In order to improve the efficiency and socio-economic return of budget expenditures, this study is focused on evaluating the efficiency of budget investments during the performance audit. This study is aimed at reviewing the role and capabilities of the performance audit, as a mechanism of public financial control of budget investments. Data Envelopment Analysis (DEA) is used as a method for evaluating efficiency. Taking into account the reference management, the DEA algorithm is proposed to address the issue of limited input and output data to evaluate the national socio-economic development indicators. The special study of the budget investments' technical performance in the regions of Kazakhstan shows that this method can be used since it improves the flexibility and performance of evaluation in the performance audit. The stability of the concept of performance audit is therefore confirmed, showing the need for a periodic revision of the legislative and methodological base. The study highlighted the main challenges of performance audit of budget investments in the Republic of Kazakhstan and provided recommendations for improvement.*

Keywords: *performance audit, public funds, budget investment evaluation, DEA, input-output efficiency.*

Reikšminiai žodžiai: *veiklos auditas, valstybės lėšos, biudžeto investicijų vertinimas, DEA, sąnaudų ir produkcijos efektyvumas.*

Introduction

The issue of efficient use of the limited budget resources has always been on the agenda of the governments and Kazakhstan is no exception. Numerous concepts, methods and regulatory acts are developed to improve the performance of the budget system as a whole. But the issue of efficient use of

budget resources, including budget investments[1], remains.

The relevance of the performance audit of budget investments in the Republic of Kazakhstan is caused by the fact that significant volumes of budget funds are injected in development projects but the corresponding effect on the socio-economic development of the country and improving the life of people is not obvious. The average share of budget investments to GDP over the past ten years was 3% per annum, and the annual share of the development budget in the republican budget for this period was 10%. It should be noted that in developed countries, public investments do not exceed 2.5-3.5 % of GDP (Gaspar et al. 2020; Volden and Welde 2022).

The performance audit was started in the Republic of Kazakhstan relatively recently. It was pushed by the reform of the budget process in the Republic of Kazakhstan. Performance-oriented budgeting requires that the financial control system is revised.

The traditional audit concept is focused only on the issues that ensure control over development projects but does not give a complete picture of projects, regardless of whether the expected outcomes were achieved, or resources were wasted or used efficiently (Mahbuba 2012).

In this regard this study sets the goal of reviewing the role and capabilities of the performance audit, as a mechanism of public financial control of budget investments, to develop recommendations for its improvement. The highest goal is to increase the efficiency of budget investments, thereby contributing to the economic development of Kazakhstan. Based on this, it is necessary to consider the following tasks:

- determine the legal status of budget investments and performance audit;
- to consider the possibilities of developing an evaluation of the effectiveness of budget investments in the performance audit.

Considering the nature of evaluating the effectiveness of budget investments, it is proposed to use non-parametric methods and evaluating not the absolute, but technical efficiency. The authors carried out a quantitative assessment of the technical efficiency of budget investments in the regions of Kazakhstan by the DEA method.

The results of this study showed that the use of the DEA method provides auditors with additional analytical evidence, thereby increasing the level of assessment and, accordingly, the recommendations of auditors when performing auditing of budget investments. In addition, recommendations on enhancing the legislation of the Republic of Kazakhstan in this area are provided.

Literature review

According to Waring and Morgan (2007), a performance audit is an objective and systematic evaluation of public programs or activities to determine their efficiency, sustainability, and effectiveness.

Various interpretations for the performance audit were developed by the highest financial control bodies. The International Organization of Supreme Audit Institutions states that "the performance audit is aimed at promoting the increase in savings, efficiency, and effectiveness in the public sector. It is also aimed at promoting proper governance, accountability, and transparency" (ISSAI 3000 2019).

It is believed that its main goal is to evaluate the efficiency of the use of budgetary funds and resources, that is the correlation between costs and outcomes (Ahlenius 2000).

According to Courville (2003), the audit is understood as an agent of changes to achieve a wider social goal, when auditors can act in accordance with the guidelines, and not just perform the functions of the inspector. In this context, the audit can serve both for diagnostics and verification, which help the control system identify issues and increase the capacity for introducing the necessary changes.

Mattei, Grossi, and Guthrie (2021) considering the trends in the research of the public sector audits

[1] The legislation of the Republic of Kazakhstan provides for the concept of "budget investments" and there is no concept of "public investments".

found out that the focus of research has shifted from compliance to efficiency.

The fact of an increased number of research and the use of performance audit is confirmed by many works (Mackevicius and Daujotaitė 2011; Parker, Jacobs, and Schmitz 2019; Parker, Schmitz, and Jacobs 2021; Rana et al. 2021).

Methodology

The below tasks are the main ones for achieving the goal:

1. Determining the role and possibilities of the performance audit, as a mechanism of public financial control of budget investments of the Republic of Kazakhstan.
2. Rethinking the concept of "budget investments" under the legislation of the Republic of Kazakhstan so as to properly set the task for performance audit.
3. Consideration of the possible use of the DEA method to evaluate the performance of budget investments during the performance audit.

The analysis of literature revealed the role and possibilities of performance audits.

This article proposes to consider the DEA method for evaluating the performance of budget investments that public auditors can use. This non-parametric method allows to compare the efficiency of processes characterized by inputs and outputs regardless of correlations between them.

The DEA based on optimality Pareto uses multi-purpose programming, which easily adapts to the analysis of input-output efficiency with several inputs and several outputs.

The DEA method assumes that the decision-making unit (DMU) receives some resources (input) and, transforming them during its operation, gets the results of the activity (output). Efficiency is determined as a ratio between the incoming resources and the results achieved. The task of DEA is to assess the boundary of production capabilities, and not the production function itself.

The type of model is usually selected from two options: radial (CCR, BCC) (Charnes, Cooper, and Rhodes 1978) and non-radial models (RAM, SBM) (Tone 2001). In practice, radial models are used more often, since non-radial models require the weights of indicators, which can distort the results of the analysis.

The choice of return to scale is determined by an assumption of the type of production function. Constant return (CRS) is selected if the costs must be strictly proportionally increased to increase the result, otherwise the variable returns to scale (VRS) is selected.

The model can be oriented on costs and on outcomes. The first one allows evaluating how much the costs can be reduced to achieve the set outcome, and it is used when governance practices can have a significant effect on costs. The second is used when the outcomes can be manipulated based on the given volume and structure of the resources used.

In this empirical study, using DEA method we evaluated the relative efficiency of budget investments in the regions during 2017–2021.

For this work we used an official source of data – the Bureau of National Statistics of the Republic of Kazakhstan (new.stat.gov.kz). The main indicators from the statistics include indicators of budget investments, as well as indicators of macroeconomic efficiency of budget investments, i.e. gross regional product (GRP), private investment (PI), and employment (Empl). In addition, for the use of DEA it is important to consider that the outcome indicators are straight, i.e., a bigger figure reflects a better outcome. The indicators used are summarised in Table 1.

The unit of analysis is region I during year t used as DMU. The fact that all regions were included in one panel for all years made it possible to evaluate both the efficiency of the regions relative to each other and the dynamics of each region in time. With this approach, the efficient border can include regions from different

Table 1. *Indicators used for evaluating the efficiency using DEA method*

Item	Input	Output	Unit
Budget investment (BI)	√		billion tenge
Gross regional product (GRP)		√	billion tenge
Employment (Empl)		√	thousand people
Private investment (PI)		√	billion tenge

Source: composed by the authors.

years, and this will give a single "benchmark" for comparison. At the same time, a kind of drawback of this approach may be that the best region can get to the border every year of research and its dynamics will be impossible to evaluate. On the other hand, this will mean that this region is steadily efficient.

It is known that a feature of the DEA method is that the results are hugely sensitive to extreme values. However, this can be addressed by excluding outbreaks from the sample. Thus, we excluded regions with extreme values from the censored sample of the regions: two regions and three cities of republican significance due to high population density and extremely high income/expenses, budget investments. In addition, three regions newly created in March 2022 were not considered. So the final sample for the period 2017–2021 includes 12 of the 20 regions, each of them was given a symbolic name.

When building a DEA model, we used a variable returns to scale (VRS), that is, an increase in costs leads to a disproportionate increase in the outcome. The model we used is performance-oriented. This means that we evaluated to what extent the DMU can achieve results with the specified costs.

The set of inputs is $I = \{1,\ldots,m\}$, the set of outputs is $O = \{1,\ldots,n\}$ and the set of DMUs is $S = \{1,\ldots, s\}$. The inputs are represented by $s \times m$ matrix X, where x_i is a column vector of inputs associated with DMU, i, and x_{ij} represent the i value that DMU uses for input j. The outputs are represented by a $s \times n$ matrix Y, where y_i is a column vector of outputs associated with DMU i and y_i represents the i value that DMU produces for output j. Vector v represents a row vector of input weights, and μ is a row vector of output weights associated with the multiplier form of DEA. Vector λ is a column vector of composite weights, associated with the envelopment form of DEA. Let ϵ be a non-Archimedean element, i.e., a number smaller than any positive real number. Let $s+$ and $s-$ be a vector of slack variables for the outputs and inputs, respectively.

$$\begin{aligned} max \quad & \phi + \epsilon(\sum_{i\in I} s_i^- + \sum_{j\in O} s_j^+) \\ st: \quad & \sum_{r\in S} x_{ri}\lambda_r + s_i^- = x_{oi}, \text{ for } i \in I \\ & \phi y_{oj} - \sum_{r\in S} y_{rj}\lambda_r + s_j^+ = 0, \text{ for } j \in O \\ & \lambda_r, s_j^+, s_i^- \geq 0, r \in S, i \in I, j \in O. \end{aligned} \tag{1}$$

In this work, efficient DMU with performance indicator 1, and the efficiency of others is estimated through the distance to the border, their efficiency indicator takes a value from 0 to 1.

The Malmquist Index is also used, which is available for measuring efficiency changes (Lee and Cho 2015).

To calculate the index, various methods are used, including the DEA method, since this method can process many outputs and inputs at the same time. When using DEA, you need to solve several optimization problems for each of the objects in the sample (Coelli et al. 1998, 275):

$$max\phi\lambda(\boldsymbol{\phi}), \quad \begin{aligned} &-\boldsymbol{\phi} y_{it} + Y_t\boldsymbol{\lambda} \geq 0, \\ &x_{it} - X_t\boldsymbol{\lambda} \geq 0, \\ &\boldsymbol{\lambda} \geq 0. \end{aligned} \tag{2}$$

$$max\phi\lambda(\boldsymbol{\phi}), \quad \begin{aligned} &-\boldsymbol{\phi} y_{is} + Y_s\boldsymbol{\lambda} \geq 0, \\ &x_{is} - X_s\boldsymbol{\lambda} \geq 0, \\ &\boldsymbol{\lambda} \geq 0. \end{aligned} \tag{3}$$

$$max\phi\lambda(\boldsymbol{\phi}), \quad \begin{aligned} &-\boldsymbol{\phi} y_{is} + Y_t\boldsymbol{\lambda} \geq 0, \\ &x_{is} - X_t\boldsymbol{\lambda} \geq 0, \\ &\boldsymbol{\lambda} \geq 0. \end{aligned} \tag{4}$$

$$max\phi\lambda(\boldsymbol{\phi}), \quad \begin{aligned} &-\boldsymbol{\phi} y_{it} + Y_s\boldsymbol{\lambda} \geq 0, \\ &x_{it} - X_s\boldsymbol{\lambda} \geq 0, \\ &\boldsymbol{\lambda} \geq 0. \end{aligned} \tag{5}$$

In these problems, indices S and T mean the initial and final periods of time, index i means the object for which calculations are made. As in the model (1), Y and X are the output and input matrixes for all objects in the sample, and λ is the vector of weight coefficients that form a linear combination – a hypothetical object, which is the goal for an inefficient object. Problems (4) and (5) have an important feature – the indicators of the object and the technology, that is tested for efficiency, belong to different time periods: in problem (4) the object from the previous period is compared to the technology of the following period, and in problem (5) on the contrary, the object from the following period is compared to the technology of the previous period. It is important to note that in problems (4) and (5) that efficiency indicator, which in such models is defined as a value reverse to **ϕ**, can be above 1. This is possible if problem (4) has a technical regression in this group of objects, and in problem (5), on the contrary, technological progress.

Results

To reveal the problems of performance audit of budget investments in the Republic of Kazakhstan, namely, why control over expenditures is carried out, and not the achievement of socio-economic results, the regulatory framework of Kazakhstan is considered.

According to the results, it was determined that, according to the legislation of the Republic of Kazakhstan, the performance audit of the use of funding from the Republican or local budget is carried out, which is happening now in practice.

So, according to the Law of the Republic of Kazakhstan "On State Audit and Financial Control", the performance audit is defined as one of the types of state audit, which is understood as an evaluation and analysis of the operations of the subject of a state audit in terms of its efficiency, economy, productivity, and effectiveness.

The subjects of the state audit include public bodies, state institutions, the quasi-governmental sector, as well as recipients of budget funds.

The supreme body of the audit and financial control of the Republic of Kazakhstan (Supreme Audit Chamber of the Republic of Kazakhstan) audits the efficiency of the budget investments use.

Based on the above definitions, we would like to bring your attention to the fact that an evaluation and analysis of operations of a public body, state institution, a subject of the quasi-governmental sector and a recipient of budget funds in terms of efficiency, economy, productivity and effectiveness of the use of budget investments are carried out.

While the law defines budget investments in the Republic of Kazakhstan as "financing from the Republican or local budget, aimed at creating and (or) the developing the state assets through the implementation of budget investment projects, as well as the formation and (or) increase of the equity of legal entities, with the exception of assets used for taking urgent measures to ensure socio-economic stability."

Thus, the problem comes from the incorrect definition of budget investments. Investments are not a process, and it can't be defined as financing. An investment is an asset that has value.

That is, the evaluation and analysis in line with the principles of the performance audit is carried out only in terms of disbursement of budget funds aimed at creating infrastructure under budget investment projects. Evaluation and analysis of the efficiency, economy, productivity, and effectiveness of the newly created or reconstructed public assets in terms of its value for the population, its influence on the socio-economic development of a particular region, and the state as a whole, is not carried out. Current government policy is still aimed at expense management rather than managing the results which is characterized by the disbursement of budget funds allocated.

The performance audit of budget investments in Kazakhstan is carried out within the framework of public programs and national projects, which is reasonable and is in line with international practice. However, the targeted indicators for evaluating budget investments that do not correspond or are completely missing is yet another issue. Therefore, the full evaluation and analysis of the efficiency of budget investments is not possible.

In addition, the full-fledged performance audit will require that the control authorities will seek for and decide upon unbiased methods for evaluating the efficient spending of budget funds. This requires adequate development of theoretical and methodological aspects of performance audits, and the creation of reasoned methods for evaluating the efficient spending of budget funds.

In order to develop specific proposals for the Supreme Audit Chamber of the Republic of Kazakhstan and regional audit commissions to assess the effectiveness of budget investments, the authors proposed the DEA method.

This proposal is justified by the fact that when evaluating the effectiveness of budget investments, it is impossible to use profit which is normally used for evaluating performance in commercial sectors, or to create any other absolute indicator. One of the most common approaches is now the use of non-parametric methods and evaluating not the absolute, but technical efficiency.

A full description, justification of this method and characteristics of input and output data are given in the methodology.

To substantiate the proposed proposal, the authors carried out a quantitative assessment of the technical efficiency of budget investments by the DEA method. Technical efficiency reflects the ability of regions to transform budget investments into the results of socio-economic development, namely into gross regional product, employment and private investment.

For the period 2017-2021, three out of 12 regions of Kazakhstan (Alm, Kar and Man) showed stable efficiency of budget investments. That is, with the allocated amounts of budget funds, the maximum targets for the above three indicators of socio-economic development were achieved. One region of Akt has been demonstrating effectiveness for the last two studied years. Their performance indicators are equal to 1 (Table 2).

It should be noted that effective regions are industrially developed regions and it's worth noting that Man has the lowest budget investments volume out of the 12 regions considered, Kar – medium, like Akm, Akt, Zha, Kos and Kyz, and Alm as well as VKO. The closest to the efficient border are three regions as well (Akt, Pav, VKO).

Kyz, Akm, ZKO and Zna demonstrated the worst performance indicators for 2017-2021, however, normally they show no positive dynamics.

Akt, Pav and VKO show sustainable positive dynamics.

Table 2. *Efficiency, output orientation, VRS*

DMU	2017	2018	2019	2020	2021
Akm	0,481182	0,803438	0,78717	0,792785	0,638745
Akt	0,898844	0,983488	0,857747	1	1
Alm	1	1	1	1	1
ZKO	0,858872	0,843596	0,875974	0,712992	0,663151
Zha	0,852123	0,968378	0,87304	0,709031	0,760348
Kar	1	1	1	1	1
Kos	1	0,883188	1	0,798385	0,84178
Kyz	0,731797	0,654144	0,670552	0,633271	0,607946
Man	1	1	1	1	1
Pav	0,941898	0,663864	0,611893	0,885455	0,91178
SKO	0,690944	0,583516	1	0,913872	0,851448
VKO	0,957765	0,906624	0,910132	1	0,979395

Source: composed by the authors.

The regions with low efficiency include those that have high-cost indicators and insufficiently high results. At the same time, the level of efficiency remains low and does not change significantly.

We recommend using the information in Table 3 on targeted benchmarks of socio-economic indicators of the regions with the allocated volumes of investment from the budget each year for the purposes of analysis and preparation of audit opinions. These calculations are available when using the DEA method.

Table 3. *2021, Output orientation, VRS*

DMU	Efficiency	GRP		Empl		PI	
		Original	Target	Original	Target	Original	Target
Akm	0,638943	2678,0	7175,7	397,0	621,3	418,4	688,8
ZKO	0,667884	3533,0	5475,5	322,3	482,6	352,0	633,6
Zha	0,75884	2263,0	7281,8	502,7	662,5	294,2	688,8
Kos	0,846213	3516,0	6443,3	475,2	561,6	343,4	665,0
Kyz	0,611057	1926,0	6181,7	330,1	540,2	224,1	656,5
Pav	0,916801	3883,8	4690,7	383,7	418,5	504,2	608,1
SKO	0,851529	1790,7	3696,8	287,3	337,4	276,8	575,9
VKO	0,800104	5064,0	11317,8	668,3	835,3	665,7	832,0

Source: composed by the authors.

Table 4. *Malmquist index summary of annual means*

year	effch	techch	pech	sech	tfpch
2018	1.346	0.659	0.992	1.356	0.887
2019	1.119	0.888	1.034	1.083	0.993
2020	1.007	0.643	0.987	1.021	0.648
2021	0.961	1.284	0.979	0.981	1.234
mean	1.099	0.834	0.998	1.101	0.916

effch – technical efficiency change, techch – technological change
pech – pure technical change, sech – scale efficiency change
tfpch – total factor productivity

Source: composed by the authors.

Based on these data, it is possible to determine which of the indicators has the least or greatest effect, which benchmarks should be set for each region with a specific amount of budget investments. This can also be reflected in the conclusions of state control bodies to draft budgets of different levels as recommendations. In addition, it will show the result-oriented budgets.

Table 4 shows an assessment of changes in the general productivity of budget investments. The changes in the efficiency of selected objects in dynamics are analyzed using the Malmquist index. The results of the analysis are shown starting from 2018, as compared to 2017.

In 2018-2020, the efficiency of budget investments was falling down, since the tfpch indicator is less than 1. Only in 2021, an increase in efficiency is observed by 23.4%. In general, for 2017-2021, the dynamics of the efficiency of these budget funds fell by 8.4%. This shows the overall picture of the effectiveness of budget investments in Kazakhstan.

Thus, the use of the DEA method in assessing the effectiveness of budget investments will provide the auditors with additional analytical evidence during the audit, options and benchmarks during the sampling, determining the object of audit and providing recommendations on the amount of funding and benchmarks for performance targets.

Discussion

Under the limited budget resources and the expansion of state programs, the question now is how the public audit addresses these crises, what are the problems and prospects in this area (Ferry, Radcliffe, and Steccolini 2022).

It should be noted that researchers pose different questions, including whether the audit really helps improve the public sector or it is simply a ritual of checking (Power 1997; Arthur, Rydland, and Amundsen 2012).

Mury (2018) concluded that the performance audit conducted by the highest financial control bodies in several countries is limited to the analysis of the achievement of certain pre-planned goals, and cannot be considered as a verification of the impact of government spending on the target group of the population.

Within the framework of this study, the authors also asked such questions about the performance audit of budget investments of the Republic of Kazakhstan. Having considered the legislation of the Republic of Kazakhstan, the initially incorrect definition of "budget investments" was determined. Investments are not a process, defining it as financing is not correct. Accordingly, today in the Republic of Kazakhstan, the evaluation and analysis in line with the principles of the performance audit is carried out only in terms of the disbursement of budget funds aimed at creating infrastructure under budget investment projects. At the same time, there is another issue, which is the targets that do not correspond or are not available at all for assessing budget investments.

In general, the performance audit is still used as a method of control and accountability in the public governance (Johnsen 2019; Lapsley 2008; Parker, Schmitz, and Jacobs 2021). In this connection, it is necessary to introduce appropriate amendments and additions to the legislation of the Republic of Ka-

zakhstan for a clear definition of goals and objectives, as well as performance targets when conducting the performance audit of budget investments of the Republic of Kazakhstan.

As previously mentioned, the challenges in evaluating performance of budget investments are that it is impossible to use profit which is normally used for evaluating performance in commercial sectors, or to create any other absolute indicator. Thus, the technical efficiency of budget investments should be evaluated, because technical efficiency is understood as the ability to generate outcomes based on certain resources (Farrel 1957).

Among the methods used to assess technical efficiency, such an approach as DEA is commonly used (Charnes, Cooper, and Rhodes 1978).

Bibliographic analysis of articles of 1987–2011 shows that DEA was used in 4021out of 4782 works (Lampe and Hilgers 2015). During 40 years (1978–2016), the number of articles where DEA method is used totals more than 10 thousand (Emrouznejad and Yang 2018), and this method was used to evaluate the performance of public projects by Wang, Hsu, and Tsai (2021) and some articles note that it was used in audits (Karliński 2022).

It comes as no surprise that it is recommended as a source of analytical evidence in performance auditing (GUID 3920 2019).

The main issue of using this method is related to the definition of inputs and outputs comprised in the model. The selection of a set of inputs and outputs should be made considering empirical premisses, experts` opinions, and statistical relation between inputs and outputs (Jones 2004).

To evaluate budget investments in the framework of performance audit, the results of widely cited works on the influence of these investments on socio-economic development indicators are considered below.

Early studies (Aschauer 2000; Milbourne, Otto, and Voss 2003) of the influence of public expenditures on growth included testing the forecasts of the neoclassical growth model, where public capital is complimentary to private capital, and also concluded that public investments have a positive and statistically significant impact on the economic growth.

As a result of research some experts (Gaspar et al. 2020; Agénor 2010; Spackman 2001) consider that public investments play a key role in stimulating economic growth. An increase in public investments by 1% of GDP can increase the level of GDP by 2.7%, private investments by 10%, and employment by 1.2% if the quality of investment is high (Gaspar et al. 2020).

Considering the above, the authors proposed the following data set: input – budget investments, output - gross regional product, employment, and private investment.

It needs to be remembered that benchmarking – and the DEA is a natural tool for it – can be, in the public sector, the only trail that allows for evaluating the efficiency of a given entity (Karliński 2022). Substantial flexibility in defining inputs and outputs allows for extending the application of the DEA method to examine outcomes, and not only products – which is especially vital in performance audits. It is worth quoting the objective of a performance audit: it is not only to evaluate but also to show room for improvement and points of reference – and the DEA makes it possible.

Conclusion

In general, the stability of the concept of the performance audit is now confirmed, which requires a periodic revision of the legislative and methodological framework.

To improve the performance audit of budget investments in Kazakhstan, the following is proposed:

1. to amend the Budget Code of the Republic of Kazakhstan regarding the conceptual definition of budget investments;
2. to develop a methodology for evaluating the technical efficiency of budget investments.

Based on the study, the authors concluded that the DEA method can be used to evaluate the technical efficiency of budget investments as part of the performance audit.

Acknowledgment

FINANCIAL SUPPORT: This research has been funded by the Committee of Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan (Grant № BR21882352 "Development of state audit and effective management of national resources: a new paradigm, concept and recommendations").

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VEIKLOS AUDITO TOBULINIMAS SIEKIANT EFEKTYVIŲ BIUDŽETO INVESTICIJŲ

Anotacija. *Tyrimo aktualumas yra susijęs su poreikiu pagerinti biudžeto investicijų efektyvumą Kazachstano Respublikoje. Šių investicijų panaudojimo veiklos auditas atskleis galimybes optimizuoti išlaidas ir padidinti bendrą socialinį ir ekonominį poveikį, kuris yra reikšmingas tvariam šalies vystymuisi. Siekiant pagerinti biudžeto išlaidų efektyvumą ir socialinę bei ekonominę grąžą, šiame tyrime daugiausia dėmesio skiriama biudžeto Investicijų efektyvumo vertinimui atliekant veiklos auditą. Šiuo tyrimu siekiama peržiū-*

rėti veiklos audito, kaip biudžeto Investicijų viešosios finansų kontrolės mechanizmo, vaidmenį ir galimybes. Duomenų apvalkalo analizė (DEA) naudojama kaip efektyvumo vertinimo metodas. Atsižvelgiant į etalonį valdymą, DEA algoritmas siūlomas ribotų įvesties ir išvesties duomenų klausimui spręsti, siekiant įvertinti nacionalinius socialinio ir ekonominio vystymosi rodiklius. Specialus biudžeto Investicijų techninių rezultatų Kazachstano regionuose tyrimas rodo, kad šį metodą galima naudoti, nes jis pagerina vertinimo lankstumą ir efektyvumą atliekant veiklos auditą. Todėl patvirtinamas veiklos audito koncepcijos stabilumas, parodantis, kad reikia periodiškai peržiūrėti teisinę ir metodinę bazę. Tyrimas išryškino pagrindinius biudžetinių investicijų į Kazachstano Respubliką veiklos audito iššūkius ir pateikė tobulinimo rekomendacijas.

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