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**ВЕСТНИК**

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*NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.*

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*НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.*

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## **MODEL FOR EVALUATING THE EFFECTIVENESS OF EXTERNAL MUNICIPAL FINANCIAL CONTROL BODIES**

**Abstract.** External municipal financial control bodies based on the existing models of the evaluating the effectiveness of their activities. The authors of this article have developed the model of the effectiveness of the external municipal financial control bodies, composed of complex criteria for control and expert-analytical activities, including the system of indicators for comprehensive assessment of performance, efficiency, intensity and dynamism of the activities of external municipal financial control bodies. The features of the activities of the external municipal financial control bodies of the different subjects of the Russian Federation, their powers, scale and differences in the level of economic development, quantitative results of the activities, the quality of external municipal financial control, as well as scientific approaches of Russian and foreign authors were taken into account. In order to exclude the impact on the comprehensive assessment of the effectiveness of the external municipal financial control bodies of the dimension of indicators, the method was chosen for normalizing the values of indicators relative to the highest and lowest values, with the conversion of the values of indicators to the point scale in the range from 1 to 10. The convolution of point values of indicators into the complex criterion is carried out on the basis of normalization of the sum of actual point values relative to the sum of the maximum possible point value of the indicator. On the basis of complex criteria, generalized criterion for the effectiveness of the external municipal financial control bodies is determined; it is calculated as the geometric weighted average of complex criteria. For the purpose of analyzing the effectiveness of the external municipal financial control bodies, the discriminant function divides them into more or less effective ones.

**Keywords:** external financial control, performance assessment model, external municipal financial control bodies, control and accounting bodies, discriminant function, municipal financial control, budget process, complex criteria, strategic planning, performance assessment models.

**The relevance of the topic.** Today the bodies of external municipal financial control are faced with the task of defining new strategic directions of the activity. In this regard, it is necessary, first of all, to increase the effectiveness of the external municipal financial control systems and determine the main ways to improve the activities of the external municipal financial control bodies, as well as to further improve the legislation on external municipal financial control, develop new methods, forms and types of control, aimed to the increasing the role of the external municipal financial control bodies and their full inclusion in the procedure of strategic planning of the budget process. Improving the efficiency of the control and accounting bodies of municipalities is one of the tasks of developing external municipal financial control [1, P.17]. In order to analyze the effectiveness of control and accounting bodies, it is necessary to introduce the methods for evaluating the effectiveness of control and expert-analytical activities of external municipal financial control bodies, aimed to constantly improving their activities and developing the entire system of the external financial control.

**Materials and methods of research.** The methodological basis of the research is the method of system analysis, multidimensional statistical cluster and discriminant analyses; expert method of hierarchy analysis, matrix method, on the basis of which three-dimensional model of BCG was built. The authors also used the results of the research, presented in the works of leading scientists in the field of state and municipal financial control.

**Research results.** In order to assess the effectiveness of the bodies of the external municipal financial control on the basis of analysis of existing models for assessing the effectiveness of their activities, the author developed the model of efficiency of the activity of audit bodies, composed of the complex of criteria of monitoring and expert-analytical activities of the organs of the external municipal financial control, including the system of indicators of integrated assessment of productivity, effectiveness, intensity, efficiency and dynamism of the activities of audit bodies. Among the indicators of the complex criteria, effectiveness, efficiency, intensity, economy and dynamism are highlighted [2, P.43].

The performance criterion shows the level of performance control and accounting bodies, taking into account the qualitative and quantitative performance indicators. Criterion validity shows the degree of the regulated solutions and audit bodies on elimination of violations or performance requirements and perceptions to the objects of control for appropriate action, per the employee's control and audit bodies. The intensity criterion shows the performance of qualitative and quantitative indicators of the activities of control and accounting bodies per employee of control and accounting bodies. The cost-effectiveness criterion shows the ratio of the achieved result of activity to the cost of maintaining control and accounting bodies. The dynamism criterion shows the level of implementation of the decisions on elimination of violations, execution of instructions and representations, application of comments for all activities of control and accounting bodies.

The complex criteria include several indicators that most fully reflect the indicative feature of the criterion. In order to exclude the influence of the scale of control and accounting bodies and the volume of budget funds, it was proposed to use specific, relative indicators. Indicators of integrated criterion of efficiency is proposed to evaluate the per employee regulatory and auditing bodies, including: the specific number of resolved violations; the proportion of funds, returned to the budget, the results of control and expert-analytical activities in the reporting period to the number of employees of control and audit bodies; the specific number of completed views (requirements); the specific number of resolved comments.

The indicators of the efficiency criterion are proposed to be evaluated per control and accounting body, including: the specific turnover of activities; the specific performance of activities; the specific profitability of activities. It was proposed to evaluate the indicators of the dynamic activity criterion, using the results of both control and expert-analytical activities: the coefficient of elimination of violations; the coefficient of fulfilled representations; the coefficient of considered proposals. The set of indicators of complex criteria, used to assess the effectiveness of the control and accounting bodies, can be supplemented, which indicates the universality of the proposed methodology and its further filling in the process of improving the activities of control and accounting bodies.

In order to exclude the influence of the complex estimation on efficiency of the activity of audit bodies in the dimension of different indicators was the method of normalization values of indicators for the maximum and minimum values, with the transfer values of the indicators in the scoring scale [3, P.20]. The score values of the indicators are defined in the range from 1 to 10. If the growth of the indicator increases the complex criterion for the effectiveness of the control and accounting bodies, the score is calculated, using the formula (1) below [4, P.74], which constructed three-dimensional matrices of Boston Consulting Group and evaluating the company's marketing positions.

$$Z_{ik} = T_{\min} + \frac{P_{\text{факт}}^{ik} - P_{\text{ниж}}^{ik}}{P_{\text{верх}}^{ik} - P_{\text{ниж}}^{ik}} \cdot \frac{T_{\max} - T_{\min}}{1}, \quad (1)$$

where  $Z_{ik}$  - score of the k-th indicator of the i-th criterion, the growth of which increases the effectiveness of control and audit bodies;  $T_{\min}$  and  $T_{\max}$  are the upper and lower bound of the interval of points, which in our case is equal to  $T_{\min} = 1$  and  $T_{\max} = 10$ ; the actual, lower and upper value of the k-th indicator of the i-th criterion, calculated by the control and audit bodies of the territorial entities.

If the growth of the indicator reduces the complex criterion for the effectiveness of the control and accounting body, the score is calculated, using the formula (2)

$$Z_{ik}^* = T_{\min} + \frac{P_{\text{факт}}^{ik} - P_{\text{ниж}}^{ik}}{P_{\text{верх}}^{ik} - P_{\text{ниж}}^{ik}} \cdot \frac{T_{\max} - T_{\min}}{T_{\max} - T_{\min}}, \quad (2)$$

where  $Z_{ik}^*$  - score of the k-th indicator of the i-th criterion, the growth of the effectiveness of control and audit bodies;  $T_{\min}$  and  $T_{\max}$  are the upper and lower bound of the interval of points, which in our case is equal to  $T_{\min} = 1$  and  $T_{\max} = 10$ ; the actual, lower and upper value of the k-th indicator of the i-th criterion, calculated by the control and audit bodies of the territorial entities.

In our case, Q1 - the first quartile of the variation series of this indicator for the group of control and accounting bodies, corresponds to the specific subject of the Russian Federation or the overall total volume of control and accounting bodies of the Russian Federation. For the upper limit Q3 - third quartile range of variation of this indicator by group control and audit bodies, relevant to the specific subject of the Russian Federation or the total volume of control and audit bodies of the Russian Federation [5, P.67].

In this case, formulas (1) and (2) are not quite suitable, because the values of indicators less than the lower border and more than the upper border. First quartile is equal to the minimum value of the criterion, and more than the third quartile, which is equal to the maximum value of the criterion:

$$Z_{ik} = \begin{cases} P_{\text{факт}}^{ik} < P_{\text{ниж}}^{ik}, & 1 \\ P_{\text{ниж}}^{ik} \leq P_{\text{факт}}^{ik} \leq P_{\text{верх}}^{ik}, & T_{\min} + \frac{P_{\text{факт}}^{ik} - P_{\text{ниж}}^{ik}}{P_{\text{верх}}^{ik} - P_{\text{ниж}}^{ik}} \cdot \frac{T_{\max} - T_{\min}}{T_{\max} - T_{\min}}, \\ P_{\text{факт}}^{ik} > P_{\text{верх}}^{ik}, & 10 \end{cases} \quad (3)$$

$$Z_{ik}^* = \begin{cases} P_{\text{факт}}^{ik} < P_{\text{ниж}}^{ik}, & 10 \\ P_{\text{ниж}}^{ik} \leq P_{\text{факт}}^{ik} \leq P_{\text{верх}}^{ik}, & T_{\min} + \frac{P_{\text{верх}}^{ik} - P_{\text{факт}}^{ik}}{P_{\text{верх}}^{ik} - P_{\text{ниж}}^{ik}} \cdot \frac{T_{\max} - T_{\min}}{T_{\max} - T_{\min}}, \\ P_{\text{факт}}^{ik} > P_{\text{верх}}^{ik}, & 1 \end{cases} \quad (4)$$

The experts considered the criterion of cost-effectiveness of the control and accounting bodies. The weight coefficients of the complex  $W_i$  criteria, presented in table 1.

Table 1 – Weight Coefficients of Complex Criteria

Name	Designation	Weighting Factor, $W_i$
Result	$R_1$	0,157
Effectiveness	$R_2$	0,249
Intensity	$R_3$	0,221
Efficiency	$R_4$	0,062
Dynamism	$R_5$	0,311

Thus, the final score of the k-th indicator of the i-th criterion for the effectiveness of the control and accounting body  $S_{ik}$ , taking into account the weight of  $W_{ik}$ , where  $\sum_{i=1}^n w_{ik} = 1$ , is calculated by the formula (5 or 6):0



$$S_{ik} = Z_{ik} \cdot w_{ik}, \quad (5)$$

$$S_{ik} = Z_{ik}^* \cdot w_{ik}, \quad (6)$$

where  $Z_{ik}$  and  $Z_{ik}^*$  are the value of the  $k$ -th indicator of the  $i$ -th efficiency criterion of the control and accounting body, calculated using the formulas (3) or (4).

The value of the  $i$ -th complex criterion for the effectiveness of control and accounting bodies is calculated using the formula:

$$R_i = 100 \cdot \frac{\sum_{i=1}^n S_{ik}}{\sum_{i=1}^n S_{ik}^{\max}}, \quad (7)$$

where  $S_{ik}^{\max} = 10 \cdot w_{ik}$  is the best value of the  $i$ -th criterion.

There are three ranges of complex criteria, corresponding to the low, normal and high degree of efficiency:

$R_i$  changes from 0 to 33 – low efficiency of the control and accounting body, according to the  $i$ -th criterion (level 3);

$R_i$  changes from 34 to 67 – effective activity of the control and accounting body, according to the  $i$ -th criterion (level 2);

$R_i$  changes from 68 to 100 – high performance of the control and accounting body, according to the  $i$ -th criterion (level 1).

For the purposes of performance analysis, you can increase the number of performance levels to 35=243 levels. If you represent the level of efficiency of the control and accounting body, use the set of performance levels [ $n_1$ ;  $n_2$ ;  $n_3$ ;  $n_4$ ;  $n_5$ ] (table 2).

Table 2 – Compliance of Complex Criteria with the Level of Efficiency of the Control and Accounting Body

Efficiency [ $n_1$ ; $n_2$ ; $n_3$ ; $n_4$ ; $n_5$ ]	Performance level ( $n_1$ )	Level of effectiveness ( $n_2$ )	Level of intensity ( $n_3$ )	Level of economic activities ( $n_4$ )	Level of dynamicness ( $n_5$ )
11111	[0;33]	[0;33]	[0;33]	[0;33]	[0;33]
11112	[0;33]	[0;33]	[0;33]	[0;33]	[34;67]
...	...	...	...	...	...
12312	[0;33]	[34;67]	[68;100]	[0;33]	[33;67]
...	...	...	...	...	...
33333	[68;100]	[68;100]	[68;100]	[68;100]	[68;100]

On the basis of complex criteria, the generalized criterion for the effectiveness of control and accounting bodies was determined. It is calculated as the geometric average weighted of complex criteria:

$$R_g = \sum W_i \sqrt[N]{\prod_{i=1}^N R_i^{W_i}}, \quad (8)$$

where  $R_i$  is the  $i$ -th complex criterion, and  $W_i$  is the weight contribution of the  $i$ -th complex criterion to the generalized performance characteristic ( $\sum_{i=1}^N W_i = 1$ ).

The discriminant function has the form:

$$Z = 0,0435741 \cdot R_1 + 0,0337995 \cdot R_2 + 0,00937661 \cdot R_3 + 0,0306479 \cdot R_4 + \\ + 0,0242221 \cdot R_5 - 7,31904$$

Analysis of the significance of the discriminant function showed, that it has significant canonical correlations 0.905 and low values of the  $\lambda$ -Wilkes statistics 0.182, which, converted to  $\chi^2$ -statistics, is equal to 14.504; indicates the significance of the discriminant function at the level above 5 % [6, P.4].

The first group of the most efficient control and accounting bodies includes control and accounting bodies, whose value of the discriminant function is greater, than or equal to zero:  $Z \geq 0$ . The second group with less efficiency includes the control and accounting bodies, which have negative values of the discriminant function:  $Z < 0$  [7, P.173].

The model was tested on the basis of performance indicators for the control and accounting bodies of municipalities of the Yamal-Nenets Autonomous District of the Russian Federation. Based on the analysis of the calculated values of generalized performance criteria  $R_E$  on the basis of three-dimensional efficiency scale, two control and accounting bodies (Yamal district and New Urengoi) have high performance (level 1), the activities of nine control and accounting bodies (Labytnangi, Salekhard, Nadym District, Priuralskiy District, Gubkinskiy, Shuryshkarskiy District, Muravlenko, Purovskiy District, Krasnoselkupskiy District) can be assessed as effective (level 2), and the effectiveness of two control and accounting bodies (Tazovskiy District and Noyabrsk) is assessed as low (level 3) (table 3) [8, P.18].

Table 3 – Testing of the model on the control and accounting bodies of the Yamal-Nenets Autonomous district of the Russian Federation

Name of Control and Accounting Body	Generalized criterion	Three-Dimensional Performance Scale	Discriminant Analysis	Discriminant Function
Yamal District	79,4	1	1	3,83802
New Urengoi	67,9	1	1	3,50896
Labytnangi	66,7	2	1	2,38752
Salekhard	66,3	2	1	1,98487
Nadym Region	49,5	2	1	0,43779
Priuralskiy District	45,4	2	2	-1,046
Gubkinskiy	45	2	2	-0,1652
Shuryshkarskiy District	42,7	2	2	-1,6188
Muravlenko	41,2	2	2	-1,1467
Purovskiy District	36,4	2	2	-1,546
Krasnoselkupskiy District	33,4	2	2	-2,9927
Noyabrsk	32,9	3	2	-2,4069
Tazovskiy District	29,5	3	2	-1,2348

Clustering of audit bodies on the basis of discriminant scores assigned to five audit bodies in the group with the most efficient operation [9, P.145]: control and audit bodies of the Yamal District, New Urengoy, Labytnangi, Salekhard, Nadym District and the remaining eight control and audit bodies in the group with the lowest efficiency. The efficiency limit is higher than 49 points (table 3) [10, P.194].

**Conclusion.** As the result of determine the levels of efficiency of the control and accounting bodies, based on generalized or complex criteria, it is possible to determine the management decisions, aimed to improving the efficiency of the control and accounting bodies. The values of complex criteria into the levels each assessed control and accounting body falls into one of 35 possible positions in the five-dimensional matrix of the effectiveness of control and accounting bodies, depending on the gradations of complex criteria. Number of the levels of complex criteria [n1, n2, n3, n4, n5] will allow formulating the management decisions, aimed to improve the effectiveness of the control and expert-analytical activities of the control and accounting bodies in the relation to five criteria: effectiveness, efficiency, intensity, economy and dynamism. Regular assessment of the effectiveness of the control and accounting bodies, accompanied by certain motivation, activates the processes of improving the effectiveness of activities, will generally improve the effectiveness of the local government. The allocation of more effective control and accounting bodies will allow you to define the control and accounting bodies for benchmarking. In the conclusion we would like to note, that two main processes of benchmarking-evaluation and comparison can be based on the author's proposed model in this article.

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### СЫРТҚЫ МУНИЦИПАЛДЫ ҚАРЖЫЛЫҚ БАҚЫЛАУ ОРГАНДАРЫНЫҢ ТИІМДІЛІГІН БАҒАЛАУ МОДЕЛІ

**Аннотация.** Авторлар сыртқы муниципалды қаржылық бақылау органдарының тиімділігін бағалаудың қолданыстағы модельдерін талдау негізінде сыртқы муниципалды қаржылық бақылау органдарының тиімділігін бағалау үшін сыртқы муниципалды қаржылық бақылау органдарының бақылау және сараптамалық-аналитикалық қызметінің кешенді критерийлерінен, оның ішінде тиімділікті, қарқындылықты, жан-жақты бағалау индикаторларының жүйесінен тұратын сыртқы муниципалды қаржылық бақылау органдарының тиімділігі моделін жасады; сыртқы муниципалды қаржылық бақылау органдарының тиімділігі мен динамикасы көрсетілген. Кешенді критерийлердің индикаторларын таңдау кезінде Ресей Федерациясының әртүрлі құрылтай субъектілерінің сыртқы муниципалды қаржылық бақылау органдары қызметінің ерекшеліктері, олардың өкілеттіктері қарастырылған. Экономикалық даму деңгейіндегі ауқымы мен айырмашылықтары, сыртқы муниципалды қаржылық бақылаудың сапасын ескере отырып, қызметтің сандық нәтижелері, сондай-ақ Ресейлік және шетелдік авторлардың ғылыми тәсілдері ескеріледі. Көрсеткіштердің өлшемділігін сыртқы муниципалды қаржылық бақылау органдарының тиімділігін жан-жақты бағалауға әсерін болдырмау үшін индикаторлардың мәндерін 1-ден 10-ға дейінгі диапазондағы балл шкаласына қайта есептей отырып, ең үлкен және ең кіші мәндерге қатысты индикатор мәндерін нормалау әдісі таңдалды. Индикаторлардың нүктелік мәндерін кешенді өлшемге жинақтау көрсеткіштің мүмкін болатын максималды нүктелік мәнінің қосындысына қатысты нақты нүктелік мәндердің қосындысын қалыпқа келтіру негізінде жүзеге асырылады. Күрделі критерийлер негізінде сыртқы муниципалды қаржылық бақылау органдарының тиімділігінің жалпыланған критерийі анықталған, ол күрделі өлшемдердің орташа геометриялық өлшенген өлшемі ретінде есептеледі. Ең тиімді жұмыс істейтін бақылау және есептеу органдарының бірінші тобына дискриминанттық функцияның мәні нөлге тең немесе одан көп болатын органдар жатады. Қызметінің тиімділігі төмен екінші топқа дискриминанттық функцияның теріс мәні бар бақылау және есеп органдары жатады. Сыртқы муниципалды қаржылық бақылау органдарының тиімділігін үнемі бағалау жергілікті өзін-өзі басқарудың тиімділігін арттыруға мүмкіндік беретін қызмет тиімділігін арттыру процесстерін жандандыратыны дәлелденді.

**Түйін сөздер:** сыртқы қаржылық бақылау, тиімділікті бағалау моделі, сыртқы муниципалды қаржылық бақылау органдары, бақылау және есеп органдары, дискриминанттық функция, муниципалды қаржылық бақылау, бюджеттік процесс, кешенді критерийлер, стратегиялық жоспарлау, тиімділікті бағалау модельдері.

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### МОДЕЛЬ ОЦЕНКИ ЭФФЕКТИВНОСТИ ДЕЯТЕЛЬНОСТИ ВНЕШНИХ МУНИЦИПАЛЬНЫХ ОРГАНОВ ФИНАНСОВОГО КОНТРОЛЯ

**Аннотация.** Органы внешнего муниципального финансового контроля базируются на существующих моделях оценки эффективности своей деятельности. Авторами данной статьи разработана модель эффективности деятельности органов внешнего муниципального финансового контроля, состоящая из комплекса критериев контрольно-экспертно-аналитической деятельности, включающая систему показателей комплексной оценки результативности, эффективности, интенсивности и динамичности деятельности органов внешнего муниципального финансового контроля. Учитывались особенности деятельности органов внешнего муниципального финансового контроля различных субъектов Российской Федерации, их полномочия, масштабы и различия в уровне экономического развития, количественные результаты деятельности, качество внешнего муниципального финансового контроля, а также научные подходы российских и зарубежных авторов. С целью исключения влияния на комплексную оценку эффективности деятельности органов внешнего муниципального финансового контроля размерности показателей был выбран метод нормирования значений по

казателей относительно наибольших и наименьших значений с пересчетом значений показателей на балльную шкалу в диапазоне от 1 до 10. Свертка точечных значений показателей в комплексный критерий осуществляется на основе нормализации суммы фактических точечных значений относительно суммы максимально возможного точечного значения показателя. На основе комплексных критериев определяется обобщенный критерий эффективности деятельности органов внешнего муниципального финансового контроля, рассчитываемый как геометрическое средневзвешенное значение комплексных критериев. С целью анализа эффективности деятельности органов внешнего муниципального финансового контроля дискриминантная функция делит их на более или менее эффективные.

**Ключевые слова:** внешний финансовый контроль, модель оценки эффективности, внешние муниципальные органы финансового контроля, контрольно-счетные органы, дискриминантная функция, муниципальный финансовый контроль, бюджетный процесс, комплексные критерии, стратегическое планирование, модели оценки эффективности.

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