



# The development of IT Support for Non-Financial Audit

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This article aims to illustrate the efforts of the Accounts Chamber of the Russian Federation on the development and practical implementation of IT support methods for non-financial audits. The article is a sequel to the article *The Information and Telecommunications System for SAI Russia Support* published in Issue 22 of IntoIT (pp26-29).

**D**evelopment of a non-financial audit methodology and its practical implementation are of great interest at present for the Accounts Chamber of the Russian Federation. It is connected with reforming the principles of budget formation at all levels carried out in our country. The very essence of the reform is the transition from the principles of estimated budget formation to accountability financing, to outcome-oriented budgets. Consequently, the non-financial audit work of the Accounts Chamber has increased.

Last year both the method and the methodology of state system audit were further developed. Just recently we have issued the monograph "Constitutional Audit" by S.V. Stepashin, the Chairman of the Accounts Chamber of the Russian Federation. This covers our theory and practice in this field.

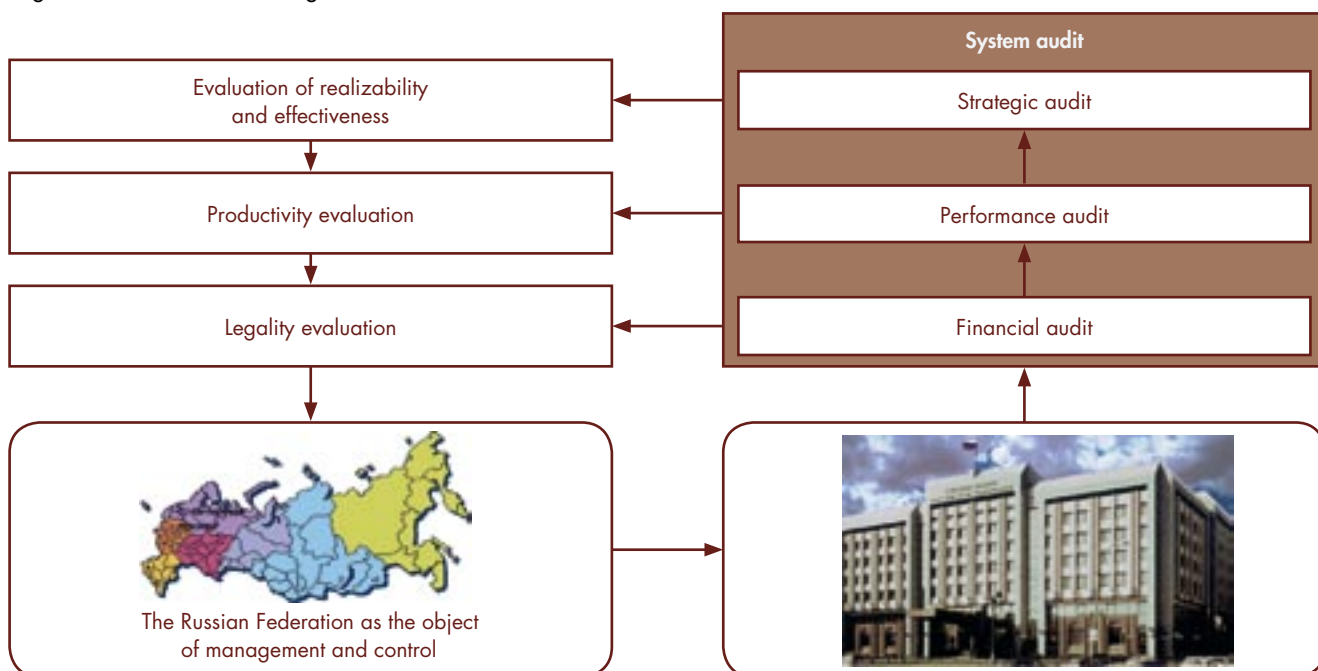
The economic basis of constitutional audit is constitutional economy, a comparatively new school of study in our country. One of the founders of this school is D. Bjuckenen, an American

economist and Nobel Prizewinner. Bjuckenen's observations were then developed by G.Tollok, D. Muller, M. Olsen, C. Rawly and R.Tollison, part of the Virginia school of political economy.

In Russia, constitutional economy as an interdisciplinary research direction was formed at the interface between institutional economy and constitutional law. Constitutional audit, as a special section of constitutional economy, is targeted at evaluation of the national resources usage with relation to the constitutional norms and challenges of state policy, taking into consideration a balance between the interests of government, individuals and society.

As regards the structure of methodological provision of constitutional audit we consider the concepts pattern of the system state audit, presented at **Figure 1**, which comprises financial audit, as expenses legality evaluation, performance audit, as efficiency evaluation, and strategic audit, as evaluation of resource provision and efficiency of the resources usage for the purposes of the national policy.

Figure 1: External control organization



Thus, performance audit and strategic audit are considered to be elements of the non-financial audit.

Methodological provision of constitutional audit is impossible without the development of mathematic models and information technologies, including those for visualising the results obtained. To see what we cannot understand yet is a major step towards understanding multi-dimensional social and economical processes. We widely used the methods of Pareto-efficient evaluations and the scope of colour coding.

Thus, **Figure 2** shows the Pareto-efficient evaluation of the efficiency of the budgetary system expenses in the subjects of the Russian Federation belonging to the Southern Federal District in respect of their Gross Regional Product (GRP). Percentage rate of growth of 2000 is shown across.

The vertical line is the ratio of the expenses of the whole budgetary system (federal, regional and local budgets) on the regional territory to their GRP volume for the last year analyzed. The above index is a circumstantial reflection of the GRP volume degree of dependence on the amount of budget financing.

The sphere sizes represent the expenses of the consolidated regional budget per capita in the subjects of the Southern Federal District, also in the last audited year.

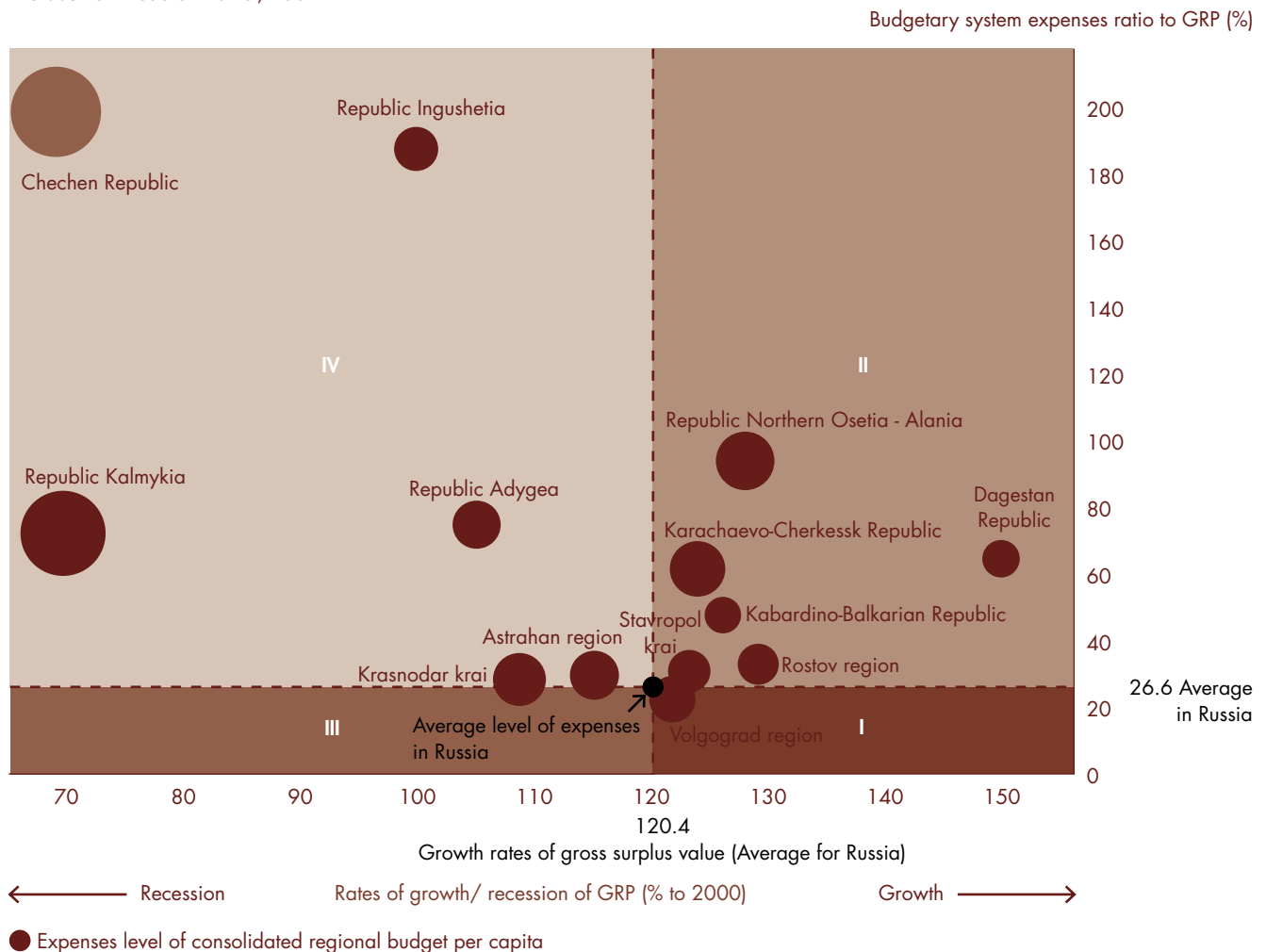
Averages of the country's GRP rates of growth, expenses to GRP ratio and average per capita expenses of consolidated regional budgets are accepted as reference marks in relation to which the regional indices are positioned. The first two plotted indices divide the whole area into 4 quadrants.

Regions with higher than the median country's rates of GRP growth and with lower than the average ratio of the budgetary system expenses and GRP are plotted in Quadrant I (right lower corner). These are the most efficiently developed subjects of the region.

On the other pole, that is in Quadrant IV (upper left), are the regions with GRP rates of growth lower than the country's average but at the same time with higher than the average expenses / GRP ratio. The further the regions are from the average values, the worse their economic situation is.

**Figure 2: Pareto-efficient evaluation of financial audit**

The Southern Federal District, 2004



Regions with higher than the country's average rates of economic growth are in Quadrant II; at the same time their dependence on budgetary financing is also higher. If the region is positioned close to the horizontal average Russian level, but is distant from the vertical average level it may be considered as quite successful. The higher the region is positioned relatively to the horizontal average level, the higher its growth dependence on budget expenses volume on its territory is; which is its unfavourable characteristic.

The regions with lower than the country's average rates of growth, but with little budgetary system expenses on their territory are in Quadrant III.

A region's position in respect to the average Russian axis do not effect directly the level of their consolidated budgetary expenses per capita. Thus, regions where this index is much higher than the one of the regions of Quadrant 1 are in Quadrant IV. Capacities of such high level of per capita expenses in the regions of Quadrant IV are accumulated on the expense of the interbudgetary redistribution of the financial means in their favour.

Thus, the Figure shows the graphical picture of the three analyzed parameters for one audited period. To analyze the dynamics it is possible to superimpose evaluations of different years on one and the same Figure. This shows migration regions in respect to each other and to the average indices, their migration from one Quadrant into another, or their moving away from or approaching to the average axis.

Methods and technologies of multi-dimensional analyses using the methods of business environment analyses (BEA) have been also developed further. A detailed report was included in issue 22 of IntoIT issue.

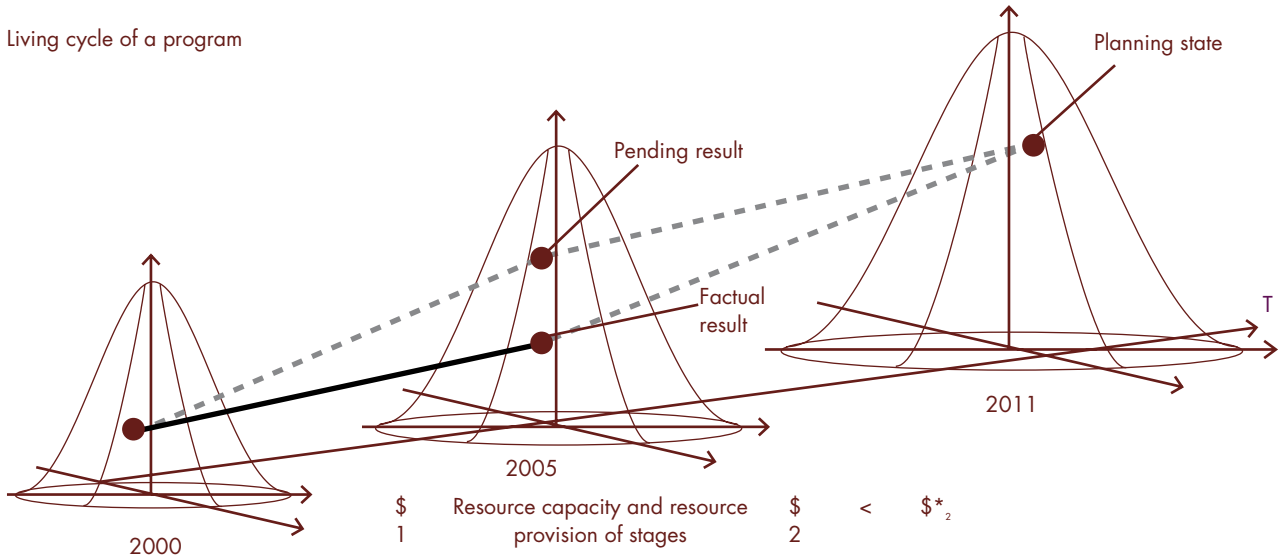
It is necessary to remember that the audited objects are studied on the basis of processing their actual in and out functioning parameters. In this case such information technology allows getting efficiency cross-sections in accordance with the chosen parameters of the audited objects as some social and economic sections. This means that we refer to social and economic tomography, in a way.

At the same time the research group under the guidance of Dr. Krivonozhko managed to find a mathematical solution to the so-called "edge" effects, which disfigured the whole picture when too large or too small objects were studied. This allowed us to carry out the work on multidimensional evaluation of state resources management efficiency with reference to the various levels of the management system.

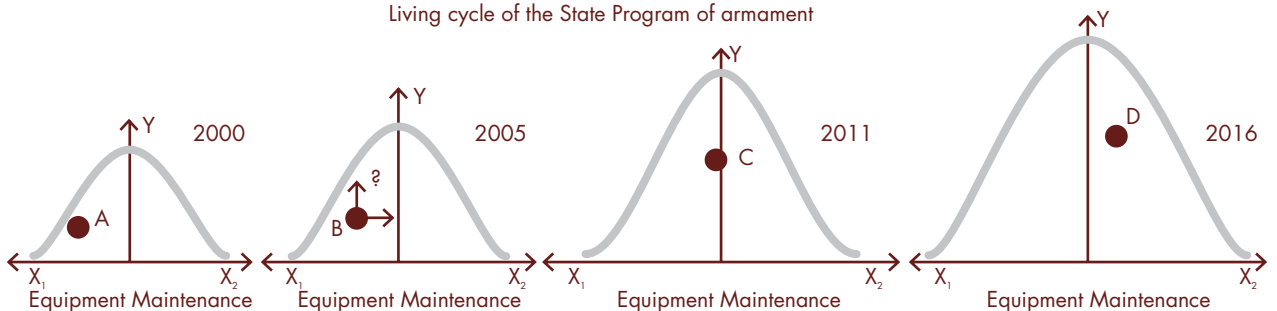
It is clear that this system is formed of the efficiency of the budgetary funds expenses by the municipal authorities, authorities of the federal subjects, federal districts and federal government (as shown in Figure 3).

Figure 3: DEA approach for strategic audit of programs

Living cycle of a program



Living cycle of the State Program of armament



Until recently the municipalities of the Russian Federation were not allowed financial independence and could not influence the effectiveness of the budget system expenditures. In order to estimate government activity it is necessary to select countries with comparable development indices, which seems to be a challenge. Therefore the Accounts Chamber has concentrated on the evaluation of the efficiency of budgetary system expenses at the level of federal subjects and federal districts.

Figure 4 shows the dynamics of the comparative effectiveness of the budgetary system revenue potential usage in regions of the Southern Federal District, while Figure 6 shows the above in all federal districts of the Russian Federation, obtained with the help of the DEA method. The evaluation was carried out between 2000 and 2004, and it is obvious that at the essential growth of the resource potentialities the effectiveness of the taxation capacity usage varies and deteriorates as a whole, which allows us to diagnose the causes of this phenomenon.

The level of the efficiency indices is a comparative value. If in the aggregate of the analyzed regions there are regions which at the lowest resources indices have the maximal profits indices they are positioned as the regions with 100 per cent efficiency. Other regions have resources of the efficiency increase from the achieved level to 100 % one.

The degree of regional differences of efficiencies indices is reflected in the fluctuation range. Figure 4 demonstrates that at worsening of the efficiency indices in the most regions for the audited period the degree of its regional differentiation is rather high and has not been changed. This contradicts the challenges of regional social and economic situation levelling.

Figure 4: Levels of state administration



Figure 5 shows that at federal districts effectiveness analysis at the beginning of the audited period, the effectiveness indices were rather low. But during the audited period, while the showing in the most regions were worsening and Urals federal region reserved the same status, the range of the effectiveness indices fluctuation almost doubled.

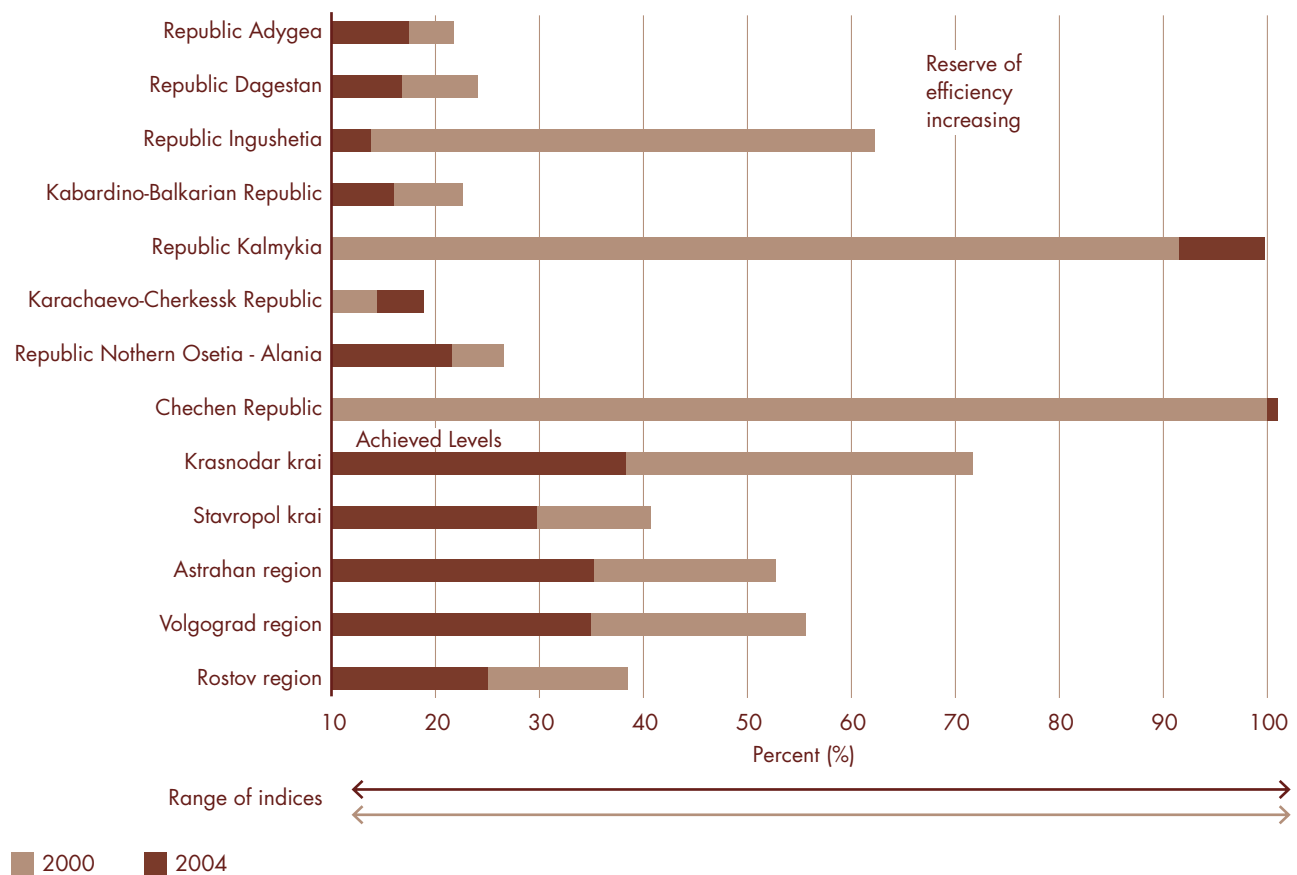
It is very important that the DEA method allows to evaluate these processes dynamically in relation to the expenses functional classification and to program-aimed approach.

In Russia some national projects have been launched, targeted on the improvement of the population quality of life, which, per se, are the "pilot" projects for transition to performance budgeting. There is a close connection between appropriated financing and estimated indices in these projects – as a rule, they are quantitative natural indices.

The above method allows us to estimate the movement pattern to the subjects in view, taking into consideration the changes in the business environment, which may be partially beyond the boundaries of analysed project impact, to estimate the effectiveness of the used solutions at the various stages of the projects and programmes life cycle (Figure 6).

For example, the programme subject occupies different space at the sections of Pareto-efficient surface (points A, B, C and D at the lower part of Figure 6, in parameters (X1 and X2) ratio changes substantially, absolute meaning of effectiveness parameter (Y) has increased). But it has not reached the possible effectiveness, since it is not plotted on the circumflex Pareto-efficient surface which has been also changing during this time. If the project objective is to reach this possible effectiveness, then the objective has not been reached.

Figure 5: Dynamic of comparative efficiency of budgetary system revenue potential use in regions of the Southern Federal District of the Russian Federation



The IT system of audit support of the Accounts Chamber of the Russian Federation has implemented some other software components and has put them in use, oriented first of all on the non-financial audit, including:

- decision taking risks estimation;
- cluster analysis and data mining;
- three-dimensional visualization.

There are some approaches to process project management audit under development as well.

The whole complex of the above mentioned components forms the performance and strategic audit elementary set of instruments. We think that such set of instruments may be considered as a typical element set of the SAI IT system model.

Figure 5: Dynamic of comparative efficiency of budgetary system revenue potential use in Federal Districts of the Russian Federation

