

Human-Computer Interaction in the Public Sector Performance Evaluation Analysis

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Abstract. Public sector performance evaluation analysis should lead to: increasing accountability and reports' transparency of budgetusers; addressing the most important issues and challenges that relate to the public interests; improving the economy, efficiency, and effectiveness of budgetusers. The main research materials for this paper are based on data from a surveys and follow-up interviews of Russian budgetary managers and accountants at mostly local authority level. The survey result sets priorities some indicators to the performance evaluation in the public sector using computer Statistical Package for the Social Sciences (SPSS). Human-computer interaction has produced high reliability data counting and defining the most important indicators. As a result of the human-computer interaction analysis, we were able to deduce the weight and value of some performance indicators in the public sector.

Keywords: Public sector key performance indicators (PSKPIs) · Budget policy · Performance measures · Outputs · Outcomes · Budgetusers · Human-computer interaction analysis

1 Introduction

The every citizen demands greater understanding of where their tax rubles go and spend. “Citizens expect accountability and transparency. They expect to have easy access to details on how jurisdictions are using funds and how well departments and agencies are performing. Linking data on available financial and human resources to the current performance level of services gives citizens a multi-faceted view of services and performance, while providing elected officials with an evidence-based budgeting tool” [12]. So, “responsiveness and citizen engagement are common themes among public management scholars in performance evaluation, e-government, as well as, public budget and finance” [10]. For this reason, it is important to understand how social welfare fit into the conventional set of performance indicator distinctions. Herewith, “government performance measures should be clearly defined and remain stable over time” [3] while “standard typologies of indicators generally posit three broad levels of indicators—inputs, outputs and outcomes” [14].

In addition, a useful typology of these indicators may be “subdivides them into to broad sets—(1) rules of the game and (2) descriptors of capacities of the various agents involves in a given governance system” [15]. Performance evaluation is only one of the management tools. The basis of this position is simple: if the organization is complex and consists

of many different components, evaluation of this activity should be complex and multifaceted. It has been said that the public sector cannot improve what it does not measure, especially given the “significant reduction in government funding with increased community demand for quality services” [9]. The public sector key performance indicators (PSKPIs) need to be based on a comprehensive system of indicators [6, 11] and criteria for the public sector, adapted to the strategic goals of public policy [5, 12, 15].

Indicators system should provide evidence on “how well that system is achieving each of its functional objectives. Such indicators capture the extent to which the immediate objectives of specific institutional reforms are being achieved. More specifically, such indicators measure aspects of organizational behavior and practices whose variance reflects the extent to which a particular governance system is achieving its various functional performance objectives” [15]. As monetary value creation is not a relevant measure for budgetusers, “these organisations are encouraged to measure and manage their performance in pursuit of their non-financial mission... Accounting measures are a common basis to performance reporting.” [5]. Many of searchers point that “differences in policy interpretations can make it difficult to clearly define performance measures, particularly outcome measures” [3], because government organizations [as well as budgetusers] are invariably connected to multiple internal and external institutions, such as government, the media, communities, politicians, and the global economy [8, 9, 11]. Most budgetusers need a clear, precise statement of purpose and description of the work assignment in conjunction with readily identifiable responsibility for the quality of their work [16]. Performance evaluation must have indicators that measure: (1) effectiveness, in which degree the product/service meets the established standards taking into account the demands of customers; (2) efficiency, in which degree the product/service is being produced at a minimum expenditure; and (3) quality, in which degree the product/service is suitable for using by the customers. In this case, one of the main effectiveness criteria should be an assessment of how well they manage to achieve outcomes and/or outputs according to New Public Management (NPM), despite of that fact that “there is a paradox associated with using outcome data as a basis for making decisions about future resource allocations” [10]. Also governance facilitates-rather than directly delivers both outputs and final outcomes. Bearing in mind “one needs to employ an additional typology of indicators in order to be able to shed light on both (a) what factors contribute to improving the performance of any given governance system, and (b) what impacts those governance systems have on both outputs and outcomes of government policies and programs, as well as how those impacts are conditional on other factors (e.g. context)” [14].

We have chosen to study the changes in performance evaluation of budgetusers by focusing on performance-based budgeting in Russia. The rhetoric of these reforms under NPM promises increased efficiency of budgetusers and in this sense, the rhetoric also promises modernization of the public sector [1, 2]. “The ideas of NPM have been observed in many countries. Their adoption and existence does not necessarily mean that the potential contribution of NPM is not easy to realize, nor does it mean that they are accepted.” [4]. We have used the budgetusers managers as an exemplar to explore performance evaluation of Russian public sector. Russians has made efforts to implement NPM ideas, but remains resistant, for a variety of reasons. In our study, we are

talking about the development of a simulation model of a system of common indicators for the whole of the public sector, similar to the system of national accounts, which can be used in any country, regardless of the authorities there. SNA works in any country and is a system of indicators across the whole country. We pay attention to the development of indicators system to assess the public sector, which will operate in any public sector, regardless of the management system, like SNA, but on the other, a more narrow level. The model is being developed using several methods and approaches: expert method based on intuition and experience of the authors in the process; a means for keeping score on performance for operations and results; establishing performance goals in measurable terms; developing appropriate measures; analyzing performance [13]; etc. We are conducting now only qualitative case study of a possibility of creating a system of indicators across the public sector as a whole.

This paper continues with a brief introduction of the theoretical approaches to performance evaluation of budgetusers by focusing on performance-based budgeting in Russia. In Russia the development of the state performance evaluation system is still at an initial stage, because detail action implementation law regulations have not yet been issued. While a raft of legislation has been issued, the system of performance evaluation and evaluation in Russia are still mostly on paper. This system is based on policy assessment rather than on implementation. There is a coherent policy management focus, but it is disconnected from actual performance management.

The next part describes in more detail the methodology of the public sector performance assessment. The paper discusses and concludes with some considerations to be taken into account by developing Russian public sector performance evaluation.

2 Methodology and Finding

The absence of performance monitoring systems in Russia prompted this series of interviews to explore the key performance indicators of public sector. To extend and deepen our previously researches [1, 2], we have analysed theoretical and realistic indicators from public sector managers and accountants. For this purpose we developed a questionnaire. The questionnaire consisted of several questions which were important to characterize the attitude of Russian public sector reforms. We made a relatively short but informative one-page questionnaire. This questionnaire was composed of 16 questions, but in this paper, only seven of them are considered. The other eight questions were not taken into account as unsuitable to this study. For example, in one of unsuitable questions were asked about the degree of the Government Financial Statistics Manual (GFSM) knowledge.

The survey instrument was developed by the author as entire interviews among mostly municipal servants - participants in improvement courses. Interviews were conducted before beginning of the competence improvement courses with each participant, lasting for about 10–15 min. The purpose of these interviews was an open discussion around indicators' assessment results to get practitioners' own interpretations. After completing the questionnaire and interviews, filled-out questionnaires and interview notes were again thoroughly analyzed.

The questionnaire was distributed to 82 respondents during a workshops and follow-up interviews. The seven surveys took place on 11.07.2013, 07.10.2013, 28.10.2013, 25.11.2013, 31.01.2014, 14.02.2014, 23.04.2014 in Perm (Russia) and consisted of practicing mostly local level authorities managers and public sector accountants from different types of organizations, such as educational establishments (e.g., colleges, schools), healthcare institutions, employment institutes, etc. Finally, 74 in total (73%) but 60 full completed (vs. 82 distributed) questionnaires were received. Because it is slightly difficult to handle a lot of questionnaires manually, we design and install computer program as a tool of human-computer interaction to count surveys' result.

First of all we asked general questions about age, experience type of entity funding budget and scope. Basic information about all of the respondents in these surveys is provided in Table 1.

Table 1. Total numbers of responses in seven surveys.

Age			Funding budget		
Younger than 30	Between 30 and 50	Older than 50	Federal	Subject of Federation	Local
19	43	12	3	31	40

Experience in a budget area			Type of organisations			
Less than 5 years	Between 5 and 15	More than 15 years	Autonomous	Budgetary	Agency	Other type
17	41	16	17	23	30	4

Scope							
Government management	Municipal management	Healthy	Culture	Education	Social protection	Employment	Another type of activity
3	22	17	3	19	1	1	8

Respondents mostly work in an agency (40%) and budgetusers (31%) with between 5 and 15 years' practical experience (55%), between 30 and 50 years (58%). It should be noted that 81% (60 from 74) of the respondents earned a higher economic education.

There were two tables in questionnaire: (I) consists of assessment researchers' selected PSKPIs, (II) PSKPIs were created by respondents. In Table 1 respondents should be determining the extent to which they perceived a need for PSKPIs and any difficulties which may arise in compiling a schedule of such indicators. The respondents noted that the focus should be wider than just the usual financial figures. In their opinion, PSKPIs of public services should reflect the level of satisfaction with these services. In addition, the quality of public service has no less significance, as well as the duration of this service delivery. It is necessary to notice that it was not evident how to take such an initiative forward, with different views on the most appropriate body to be responsible for their development. They agree that the indicators would be an extremely useful management tool, with the potential to increase the quality of service. On other hand

they had been concerned that the indicators can be used as a discrimination tool (removal of bonus, different sanctions, dismissal, etc.).

So we asked respondents about significance of the most important indicators from researchers' chosen PSKPIs (Table 1 questionnaire). These indicators were chosen by researchers (including author of this paper) as a result of decades-long research and many interviews with professional public sector managers and accountants in the setting of a competence improvement course. Views in the survey were recorded under the following 10 indicators: (1) the social significance of the entity; (2) the accessibility of rendering services to population; (3) the quality of rendered services; (4) financial result; (5) the duration of service delivery; (6) resource endowment; (7) the share of the financing to buy fixed assets; (8) the level of assets acquired by the budget; (9) the share of unused fixed assets in total assets; and (10) the number of PSKPIs used in the evaluation. These indicators are marked in the questionnaire and participants are required to rate them on a 5-point scale. Example of someone completed questionnaire's table present below (Table 2).

Table 2. Assessment of proposed indicators on five-point scale by one of respondent.

	Public sector key performance indicators	1 (not important)	2 (fairly important)	3 (middle important)	4 (important)	5 (the most important)
1	The social significance of the entity				V	
2	Accessibility of rendering services to population			V		
3	Quality of rendered services				V	
4	Financial result					V
5	Duration of service delivery					V
6	Resource endowment				V	
7	The share of the financing to buy fixed assets					V
8	The level of assets acquired by the budget				V	
9	The share of unused fixed assets in total assets				V	
10	The number of KPIs used to evaluation			V		

As a result of respondents' answers we counted an average rating each of represented in Table 2 indicator. The average ratings of these indicators after seven surveys are shown in Fig. 1.

All of ten PSKPIs (see Table 2) were analyzed using statistical factor analysis by Statistical Package for the Social Sciences (SPSS). To do this, performance indicators from 60 full completed questionnaires uploaded to SPSS using human-computer interaction. For factor selection was used Principal Component Analysis. As a result we have received Total Variance Explained (Table 3).

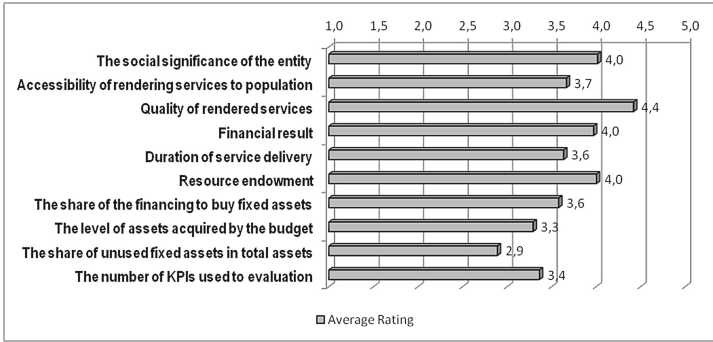


Fig. 1. Rating of entities' PSKPIs. The highest rating of all is given to the quality of rendered services (4.4), followed by social significance of the entity (4.0), financial result (4.0), and resource endowment (4.0). It seems that the public sector has to offer people more quality services and they have to start demanding better opportunities from their government. Social significance should be used to encourage public sector entities to perform their services more effectively.

Table 3. Total Variance Explained.

Component	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.599	35.987	35.987	3.599	35.987	35.987	2.737	27.370	27.370
2	1.666	16.656	52.644	1.666	16.656	52.644	2.338	23.377	50.748
3	1.164	11.638	64.282	1.164	11.638	64.282	1.353	13.534	64.282
4	.842	8.418	72.699						
5	.719	7.192	79.891						
6	.613	6.132	86.023						
7	.496	4.955	90.978						
8	.444	4.443	95.421						
9	.288	2.881	98.302						
10	.170	1.698	100.000						

Table 3 shows that there were chosen three factors: the first factor explains 36% of the total variance, the second factor—17%, and third factor—12% of the total variance. Using Rotation Method by Varimax with Kaiser Normalization was received a solution in 3 iterations when a Rotation converged. Table 4 presented arranged data in descending order.

According to Table 4 we can see that the first factor consists of following variables: The social significance of the entity; Accessibility of rendering services to population; Financial result; Duration of service delivery. The second factor consists of following variables: The level of assets acquired by the budget; The share of unused fixed assets in total assets; The share of the funding to buy fixed assets. The third factor consists of following variables: Resource endowment; Quality of rendered services; The number of KPIs used to evaluation. The semantic relationship factors is that the first factor is

mainly gathered indicators that determine the social output, second factor included indicators related to the level of budget funding, and the third factor included indicators related to the evaluation of entities. Analyzing amount of the component (Table 4) we have to pay attention to the most important variables: social significance of the entity, the level of assets acquired by the budget, and the Resource endowment.

Table 4. Rotated Component Matrix(a).

	Component		
	1	2	3
The social significance of the entity	.769		.183
Accessibility of rendering services to population	.763		.134
Financial result	.725	.313	.119
Duration of service delivery	.627	.429	
The level of assets acquired by the budget	-.107	.901	
The share of unused fixed assets in total assets	.191	.814	.123
The share of the funding to buy fixed assets	.248	.553	.228
Resource endowment	.155	.336	.702
Quality of rendered services	.497		.627
The number of KPIs used to evaluation	.512	.399	-.566

As the surveys were subdivided into two parts according to performance indicators (researchers' selected and respondents' created), finally we asked about significance of the mostly important indicators which were created by respondents in questionnaire's Table 2. There could be any numbers of PSKPIs but require no less than three.

As a result of seven surveys there were proposed (created) 265 indicators from all of respondents. Many of these indicators just were repeated and written other words or took from the working instructions for municipal servants.

Table 5. Frequency of respondents proposed indicators.

Name of indicator	Rating	Frequency	Percentage
Coverage of the population of the public sector services	5	1	1.35
Socialization of children handicapped	5	2	2.7
Index of Children's Health for kindergarten	5	2	2.7
Coverage of fostered children in difficult life situations	5	2	2.7
Prestige institutions	5	1	1.35
Cleanliness of territories	5	2	2.7
Electronic workflow	5	1	1.35
Financial motivation of employees	5	8	10.81
Quality process of service delivery, timeliness of services	4,6	15	20.27

Nonetheless, we chose the most significant indicators and arrange them in order of their ranking. Selected and sorted indexes are shown in the Table 5 in the author's interpretation. Indeed, it is extremely important to know the assessment indicators' frequency that estimated in Table 5. Sometimes it changes the pattern of significance.

We calculated the Indicators' frequency and received Table 5 data about some indicators. We do not present fully result due to the limited space in the paper.

Table 5 data shows that "Quality process of service delivery, timeliness of services" has 4.6 but 15 frequency with 20.27 percentages of respondents. So this indicator is more important than e.g. "prestige institutions" in spite of the lower ball (4.6 vs. 5.0).

3 Discussion and Conclusions

Through the research, we found several drawbacks and challenges.

One problem cited is the cost in terms of data collection and analysis; many budgetusers lack this specific expertise and must employ consultants to assist. A further challenge is the difficulty with attributing performance to a specific budgetusers. Perhaps "the largest challenge to performance evaluation is attribution. This may increase the ability of a collaborative group to claim attribution—it should bring about a better understanding of working together to achieve outcomes. Nevertheless, future research is urgently needed into how participatory methods such as outcome mapping can be achieved operationally and subsequently reported at an organizational level." [5]. However, when the budgetary entity works with others towards more complex goals, such as economic and community development or advocacy, isolating a specific budgetary entity's success or failure for attribution is very difficult. Sometimes it is impossible to identify one single reference framework for performance evaluation adaptable to all types of budgetusers. Given this, "each reality has unique characteristics that can not be incorporated into standard structures" [7]. What is more, any performance evaluation system must take into account that performance is the result of effectively activity.

So, the one of the practical drawback in the Russian evaluation models lays in the problem of linking performance indicators that objectively must be reflecting dimensions of budget funding. Herewith budgetusers are often afraid to report bad news in case it affects their future funding.

Moreover "any performance result that is not meeting its expected target undergoes careful review. Decisions on future funding can be based on current data rather than past funding trends. Arriving at this point was not a quick or ease journey..." [12]. Bearing in mind that lack of differentiation in performance evaluation is also a very drawback factor.

In addition, unless experimental methods are used to isolate a research group and a control group, attributing any outcome in a beneficiary's life to a specific budgetary entity intervention, will also be challenged. However, the need remains for budgetusers to show the difference they make in their communities, to be clear about the outcomes they are working towards, and to use performance frameworks to utilise scarce resources effectively.

Some drawbacks related to an understanding of what the essence of effectiveness is; and to the fact that the list of indicators was not always accurate. During the surveys, the following drawbacks were pointed:

- someone just do not want to answer the questionnaire. They consider it is non-useful, not worth their efforts;

- someone forget to mark their choice of the answer, which led to the difficulties of the results and the rating calculation;
- some persons respond differently on different days. For example, 30.06 during a preliminary survey someone assessed “social significance” at 5 and 11.07—at 3, and “financial result” firstly assessed at 3 and then at 5;
- they offered indicators, the significance of which were evaluated by them as non-important;
- they used to work with mainly offered by instructions indicators and there is nothing new.

In particular, we found the several drawbacks and challenges while doing the surveys: lack specific public sector expertise; attributing performance to a specific budgetusers; lack of differentiation in performance evaluation; dimensions of budget funding; chose the research group; non-understanding essence of questions or evaluation (assessment); accurate list of indicators; claiming attributions; computerisation surveys’ result.

This study led to an understanding of how effectiveness is seen by budgetary managers and how measurement systems should be valued by human-computer interaction using applying statistic package (SPSS). Also this study result helps to clarify what sorts of things have to be measured. The result highlighted that public sector effectiveness cannot be developed and discussed without taking into account the issue of state and budget strategy and policy, and special attention is needed when comparing effectiveness in different organizations. Also, the result of this study will allow comparisons of the PSKPIs among different budgetary areas. Eventually, to develop Russian performance evaluation for public sector we have following ideas for the future research:

- design and install clearly defined a comprehensive universal computerised performance evaluation system include constantly systematic monitoring how this system effectively and acceptable for each budgetary institution. Also this system must be flexible and adjustable to meet public needs;
- optimized realistic budget process to being accountability, transparency, explicitly, and understandable for each citizen;
- establish an easy, distinct, and overall accounting and auditing system of public sector;
- effectively train and certificate civil and municipal servants for performance purposes. An untrained staff may not be interested in performance evaluation, or may disagree that it is necessary. It is essential to clearly communicate with staff about what effectiveness is, what managing for results entails, and the benefits of linking resources to performance evaluation and auditing.

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