

## Management Tools for the Region's Socio-Economic Development



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**Abstract.** The purpose of the research is to assess the focusing of existing management tools on socio-economic development (SED) of the Russian Federation constituent entity. The practical rationale of the research is caused by general problems of regional development and the need to develop methodological approaches to their solution. The author used qualitative methods of cross-sectoral analysis, document analysis, and quantitative methods (those of principal components, variance calculation, correlations, regressions, and index construction). The novelty of the research is related to comparing management tools at the federal and regional levels, as well as to designing a number of administrative staff based on these tools. As a result of the study, the author proposes a method of management tools evaluation (SED strategy, priority projects, state programs), approves the methods of SED indices calculation and public services development, as well as the methods of rationing the number of managerial staff in line with SED priorities. The main conclusion is that the assessment of stated goals' achievement is complicated by a low level of program documents' compliance with official statistics indicators. Since the sectoral distribution of a number of state apparatus employees is not optimal, the author proposes its adjustment, focusing management personnel on achieving region's development priorities. The results obtained are correlated with the labor market trends. The applied forecasting of the employees number is limited by the correctness level of SED and labor productivity target indicators. When developing management tools, the regions are recommended to take into account statistical indicators that are relatively objective and to focus the performers on achieving final socially significant results. The proposed method has the potential to be replicated in the constituent entities of the Russian Federation addressing similar problems in the field of SED.

**Key words:** constituent entity of the Russian Federation, socio-economic development, strategy, national project, state program, public service.

**For citation:** Borshchevskiy G.A. Management tools for the region's socio-economic development. *Economic and Social Changes: Facts, Trends, Forecast*, 2020, vol. 13, no. 5, pp. 74–89. DOI: 10.15838/esc.2020.5.71.4

## Introduction

The increasing trends of regionalization and decomposition of management decision-making centers [1; 2] make the quantitative assessment of the tools of socio-economic development (hereinafter – SED) at the regional level relevant. A number of provisions of the theory of results-based management [3] and data-based management [4] are applied in the article. The basic hypothesis is based on the assumption that the vertical of power formed in the Russian Federation [5] requires a unity of management tools for its implementation. The study was conducted on the materials of one of the constituent entities of the Russian Federation. The results were discussed with the leaders of the region. The relevance of the research is due to the conceptual changes in the organization of the planning system in the Russian Federation that have occurred in recent years, including the adoption and subsequent improvement of the law on strategic planning (2014)<sup>1</sup>, as well as the “May” Decree of the President of the Russian Federation and national projects (2018)<sup>2</sup>.

In this article, we do not assess the level of SED indicators achievement and the regional authorities' efficiency. Our goal is to assess the focus of the existing management tools on the region's SED. The mentioned goal may be achieved by means of the following research tasks:

- 1) evaluating the interrelationships of management tools at the federal and regional levels;
- 2) checking up the consistency of the region's administrative apparatus structure and its current strategic documents;

3) conducting a statistical assessment of the targets of strategic documents;

4) checking up the degree of relationship between management tools and development of public administration employees.

The results of this analysis are of interest to all constituent entities of the Russian Federation, since they have a comparable set of management tools, and each region now faces the task of improving government efficiency.

## Literature review

We should formulate a number of working hypotheses to solve research problems and test the basic hypothesis.

H.1 hypothesis assumes that there is a clear link between SED management tools at the federal and regional levels. Russia is a state with high centralization, which is manifested in the synchronization of management practices [5], so the economies of most regions are dependent on federal budget transfers, and management tools are universal [3]. The model of “soft” federalism, which leaves the solution of many issues at the sub-federal level, does not negate the need for vertical planning [6]. Evaluating management tools is not an easy task [7; 8; 9]. The difficulty is to select a limited set of indicators for the analysis from the array of variables that affect the region's development. For this purpose, generalizing indicators such as gross regional product and human capital are used. In Russia, the priorities of long-term development are fixed in the SED strategy [10].

H.2 hypothesis suggests that there is a link between strategic documents and the structure of the regional management apparatus. Mike Danson and colleagues connect regional development with institutional changes in the system of state power [11]. Vladimir Leksin and Alexander Shvetsov revealed the difference in the concepts of “assessing the level of regional development” and “assessing the efficiency of

<sup>1</sup> On strategic planning in the Russian Federation: Federal Law no. 172-FZ, dated June 28, 2014 (amended on July 18, 2019). *Collection of legislation*. June 30, 2014. No. 26 (part I), art. 3378.

<sup>2</sup> On national goals and strategic objectives of the Russian Federation through to 2024: Order of the President of the Russian Federation no. 204, dated May 7, 2018. *Collection of legislation*.. May 14, 2018. No. 20, art. 2817.

regional management” [12]. Alexey Barabashev [4] notes that results-based management requires clear adherence to socially significant priorities, personal responsibility and reporting in relation to target indicators. Of particular importance is the ability of regional administrations to efficiently implement strategies, programs, and projects [13].

H.3 hypothesis is based on the idea that statistical observation indicators correspond to the targets of strategic documents. This approach is based on the concept of data-driven management, in which panel data is used to analyze and forecast regional development [14; 15; 16]. Accordingly, the usage of quantitative methods is acceptable to the extent that development priorities are recorded in measurable indicators [17; 18]. The unreliability of departmental statistics, along with the incompleteness of data on SED, requires operational and objective supra-departmental statistical data [19].

H.4 hypothesis assumes that management tools are related to development of state and municipal management personnel. The distribution of state employees' number should probably correspond to development priorities. Despite the fact that much attention is paid to the issues of state personnel policy [8; 20], the studies relating the distribution of human resources to SED priorities [21] have not yet gained traction. Experts usually normalize a number of employees on the basis of labor costs [22; 23]. However, in order to implement the results-based management concept, a number of public employees should be clearly related to SED priorities. Not only organizational and personnel changes, but also the level of trust of society and citizens in public servants are characteristic of management staff. In the article, we used the conclusions of some studies devoted to assessing the level of public confidence in the government [24].

### Data and methods

To test H.1 hypothesis as a tool of public administration at the federal and regional levels, the following documents were overviewed:

Executive Order of the President of the Russian Federation no. 204 “On national goals and strategic objectives of the Russian Federation through to 2024” (hereinafter – Order no. 204), dated May 7, 2018, prioritizing 13 national projects implemented in most national economic areas in all regions of the country.

Decree of the President of the Russian Federation no. 193 “On evaluating the performance of senior officials (heads of higher executive bodies of the government) of constituent entities of the Russian Federation and activities of executive bodies (hereinafter – EBs) of constituent entities of the Russian Federation” (hereinafter – Decree no. 193), dated April 25, 2019, which contains 15 indicators corresponding to various industries for evaluating senior officials' activities.

SED strategy of the Russian Federation constituent entity until 2030 (hereinafter – the Strategy), approved in 2016, is currently valid in 2018 edition, and it contains 29 SED priority directions. State programs and priority projects of the Russian Federation constituent entity are developed in accordance with the Strategy, and they are management tools for its implementation. State programs for the constituent entity (23) are calculated until the period of 2020–2025, priority regional projects (23) are developed in accordance with national projects and within the framework of the strategy.

Each of these documents highlights the targets that are compared with the targets of other documents. This method is similar to correlation analysis, but it is based on qualitative (target indicator formulations) rather than quantitative indicators. A high degree of compliance indicates that there is consistency.

Employees of the regional apparatus are more focused on the implementation of legal acts of the relevant constituent entity of the Russian Federation than on documents of the federal level. The gap in priorities makes it difficult to implement them effectively.

When testing hypothesis H.2, the priority directions of the Strategy, state programs, and regional projects are compared with the EBs structure, i.e., the region's administrative apparatus. Most areas of public administration involve interdepartmental implementation with the participation of several EB. However, each priority should be assigned to one responsible government agency that organizes the interaction of all involved structures. If a government agency is not responsible for any of the priority areas, then its activities are characterized as supporting and poorly related to achieving SED final results.

Test of the hypothesis H.3 involved comparing the Strategy targets with statistical observation indicators. Official statistics is a tool for planning and ensuring the quality of public administration. Departmental statistics, in addition to the possibility of manipulation, is first, less open and accessible for study, and, second, it is subjected to frequent changes in methodology compared to state statistics. Individual indicators of state statistics are provided by relevant agencies, but such indicators are subjected to external evaluation in Rosstat and can be compared with previous data. For these reasons, the usage of state statistics is preferable to departmental statistics. The source of data on statistical indicators is the federal plan of statistical works, and the values of indicators are taken from Russian Federal State Statistics Service (Rosstat) collections. We analyzed data for more than 10 year period (2005–2018), since it is difficult to judge development trends in a smaller horizon.

The low level of compliance between the targets and statistical indicators meant that the implementation of the Strategy, state programs, and priority regional projects is evaluated on the basis of departmental statistics, or that the targets are not subjected to statistical evaluation. Both have a negative impact on efficiency.

While testing hypothesis N.4, we compared the dynamics of priority areas of regional development with development of managerial personnel. It is assumed that the main human resources should be concentrated on SED priority areas.

First of all, *SED index* of the RF constituent entity ( $I_a$ ) has been calculated using the formula (1):

$$I_a = \frac{\sum_{i=1}^N \left( \frac{X_{r,i}}{X_{b,i}} - 1 \right) \times 100}{N}, \quad (1)$$

where:  $X_{b,i}$  is the value of  $i$  indicator in the base (first analyzed) year,  $X_{r,i}$  is the value of  $i$  indicator in the reporting (last) year,  $N$  is the number of indicators.

The index (1) is based on a set of macroeconomic indicators directly specified in the Strategy. It has been obtained by aggregating statistics indicators that are equivalent to the Strategy targets. Before the aggregation, the indicators have been normalized, i.e. converted to common units of measurement (percentages). The dynamics of most indicators was evaluated positively in the case of growth, but for some of them (mortality, crime, etc.), the decline was considered positive. The index is based on more than 70 indicators covering all priority areas.

The *index of managerial personnel development* has also been calculated (2):

$$I_{pa} = \frac{1}{T} \sum_t \frac{1}{I} \sum_i \frac{\sum_{i \in a} X_{t,i}}{\sum_i X_{t,i}}, \quad (2)$$

where:  $a$  is a region;  $i$  is the number of indicators;  $X_{t,i}$  is the value of  $i$  indicator for  $t$  year;  $T$  is the number of years.

State civil and municipal employees (hereinafter employees) of the constituent entity of the Russian Federation are considered as managerial personnel. The possibility of index building is limited to a set of indicators that meet the criteria of objectivity, measurability, comparability, relevance, and statistical independence. The indicators available in the official statistics relate to the employees' number, level of remuneration, and socio-demographic characteristics (gender, age, length of service, and level of education). They are not informative enough in their original form, so they have been transformed into specific indicators for building the index.

Comparison of indices (1) and (2) allowed determining the degree of compliance of the processes described by them in the analyzed years. The growth of both indices with a high degree of statistical correspondence is considered optimal, and the reverse situation is considered negative. The significance of the indicators that make up the indices is estimated by the principal component method.

The relationship in the indices dynamics was evaluated by constructing a pair regression on panel data, where index (1) is the dependent variable, and index (2) is the explanatory one. The model was tested for homoscedasticity by the Durbin–Watson statistic (formula 3), where  $\varepsilon_i$  is the residuals of the regression model:

$$dw = \frac{\sum_{i=2}^n (\varepsilon_i - \varepsilon_{i-1})^2}{\sum_{i=1}^n \varepsilon_i^2} \quad (3)$$

The first-order autocorrelation coefficient is calculated using the formula (4):

$$r(1) = \frac{\sum_{i=2}^n (\varepsilon_i \varepsilon_{i-1})^2}{\sum_{i=1}^n \varepsilon_i^2} \quad (4)$$

Having correlated the priority areas of the Strategy with the EBs functions, we found out whether the staff distribution of their employees corresponds to the dynamics of the corresponding areas development.

The discrepancy indicated that there were reserves for reallocating employees from overstuffed bodies to those with deficits. In this situation, it is proposed to predict a number of employees using the formula (5):

$$X_i = \left( \frac{1}{|v_{ei}|} \sum_{v_{ei}} \left( \frac{1+w_v}{1+\pi_v} \right)^{t/\alpha} \right)^{1/t} - 1, \quad (5)$$

where:  $X_i$  is the forecast of a staff number of the  $i$  EBs;  $v_{ei}$  are the fields of regulation branches of the  $i$  authority;  $w_v$  is the  $v$  SED priority directions development index;  $\pi_v$  is labor productivity growth in the  $v$  industry;  $t$  is the forecasting time-frame;  $\alpha$  is labor elasticity coefficient.

The source of data on the forecast values for the priority areas development was the target values of the Strategy indicators by 2030. The forecast of labor productivity dynamics contains a Forecast of the long-term SED of the Russian Federation for the period up to 2030. We understand labor productivity in the meaning used by the Ministry of Economic Development of Russia<sup>3</sup>.

The scatter diagrams are based on two parameters: the dynamics of the priority areas development (indicator  $x$ ) and the share of the employees' number (indicator  $y$ ). The interpretation is carried out by visual analysis of obtained scatter diagrams.

### Results

When testing H.1 hypothesis and studying the strategic documents content in detail, the following trends were revealed.

First, there is a lack of priorities coordination at the federal level: four indicators of Decree no. 193 do not correspond to the national projects, and five national projects do not correspond to the indicators of the Decree.

<sup>3</sup> On amendments to the Methodology for calculating labor productivity indicators of an enterprise, industry, or entity of the Russian Federation: Order of the Ministry of Economic Development of the Russian Federation no. 659, dated October 15, 2019.

Second, the level of compliance of the Strategy with the federal priorities is low: 12 (out of 29) priority areas of the Strategy, do not meet the indicators of Decree no. 193, five indicators of the Decree do not have similar Strategy directions, and seven Strategy directions do not correspond to the national projects.

Third, management tools are partially created. Thus, eight priority regional projects do not meet the indicators of Decree no. 193. It is surprising that there are no priority projects that meet the indicators of attracting investment, labor productivity, fighting poverty, raising wages, population growth, improving housing conditions and the quality of the environment. Regional projects do not correspond to such national projects as “Ecology”, “Digital economy”, “Demography”, “Science”, “Comprehensive plan for modernization and expansion of the main infrastructure”.

Fourth, nine regional state programs do not meet the indicators of Decree no. 193. There are no programs that correspond to the indicator of “Natural population growth”, which is strange for a region where saving people is declared a strategic goal. Seven programs were developed out of touch with the national projects.

Fifth, the high level of correspondence between the Strategy directions and regional projects and state programs is noteworthy.

H.2 hypothesis concerned checking the level of EBs’ involvement in the region’s SED. There are 39 EBs in the constituent entity of the Russian Federation. Their correlation with the Strategy directions, priority regional projects and state programs is carried out according to their functions (for example: priority direction “Public Health Protection” – national project “Health Care” –

regional project “E–Health” – program “Health Development” – Department of Health).

Data indicate that:

1) from one to three departments are responsible for each indicator of Decree no. 193 and the national project, but only about half of them are responsible for implementing the provisions of this decree and the national projects;

2) in some areas of the Strategy, there is more than one government agencies, but in some cases one agency manages two priority areas;

3) a smaller proportion (36%) of government agencies are involved in the implementation of regional projects, although up to three implementing agencies are assigned to each project;

4) each state program has a responsible executor; more than one agency is responsible for the implementation of five programs, but a number of bodies are not involved in the implementation of state programs.

Departments of economic development, health, education, agriculture and food resources are actively involved in the implementation; each department is responsible for several priority areas and projects. The Department of Construction implements two priority projects, while the Department of Labor and Employment is responsible for two regional programs. There are no EBs for several priority areas (such as industry, science, trade); in this case, the Department of Economic Development is in charge. Five government agencies are not involved in SED. There is more than one responsible body in nine priority areas, which may be explained by the unclear division of the departments’ functions.

H.3 hypothesis assumed assessing the availability of management tools with the relevant statistical observation tools. It was

revealed that only in two priority areas of the Strategy, all the targets were fully provided with statistical indicators, and two areas do not have statistical correspondences at all. Each area is described by an average of three statistical indicators. The percentage of targets that fully or partially meet statistical indicators was 48.6% (73 indicators). The formation of target indicators is mainly based on departmental, rather than state statistics.

H.4 hypothesis testing required calculating the region's GDP index using the formula (1). The index value increased by 13 p.p. in 2005–2018, and the dynamics coincided with all-Russian trends: a decline in 2008–2009, a slowdown in 2014–2015, and a moderate growth over the entire period. The development indices of 18 priority sectors increased during this period. Accelerated growth was observed in the areas of ICT (118%), tourism (98%) and demography (89%). The index declined in nine areas: primarily in professional education (-134%), finance (-59%) and foreign trade (-42%). Positive SED trends during the period of 2005–2018 can be seen as a consequence of the low base effect after the global recession of the 1990s–early 2000s. During the period from 2011 (when the current head of the region took position) prior to 2019, SED growth index was 6.9%, the negative trend was observed for 11 priority areas.

Since 2016 (Strategy approval), the SED index has increased by 7.6%, and the decline is recorded in seven priority areas. In other words, the situation of the region's economy has improved, and this can be interpreted as a recovery process after the 2014–2015 crisis.

The index of managerial personnel development in the region (2) is considered in the context of the state civil and municipal services (*Tab. 1*).

One way to select the main components for further analysis is to select those where the eigenvalues are greater than one. The first principal component (“Share of employees’ number...”) and second one (“Share of employees’ salary...”) correspond to this criterion. In total, they explain 89% of data variations. At the same time, if you build the index of public service development only for these two most informative principal components, excluding all the others, the resulting set of indices is less correlated with the dynamics of the SED index compared to the index built for all seven principal components. This indicates that, even at a low level of significance, the remaining principal components have a positive effect on the model.

Let us estimate the relationship in the indices’ dynamics by constructing a pair regression (*Tab. 2*).

Table 1. Application of the principal component analysis for macro-variables related to the development of the state civil service of the Russian Federation constituent entity

Indicator	Share of employees' number in the population PC1	Share of employees' salaries from the average in the region PC2	Share of employees with higher education PC3	Share of employees under 40 years old PC4	Share of employees completed training during the year PC5	Share of employees with more than 5 years of service PC6	Level of trust in state employees in the society PC7
Standard deviation	3.583	0.781	0.439	0.031	0.055	0.012	0.000
Share of variance explained	0.701	0.189	0.078	0.015	0.011	0.003	0.0003
Eigenvalue	4.912	1.328	0.548	0.108	0.077	0.022	0.002
Explained variance	0.701	0.892	0.969	0.985	0.996	0.999	1.000

Source: own compilation.

Table 2. Results of regression on the SED index and the index of development of the state civil service of the constituent entity of the Russian Federation

Regression statistics		Variance analysis						
Multiple R	0.729		Df	SS	MS	F	Significance F	
R-square	0.532	Regression	1	101.401	101.401	13.676	0.003	
Normalized R-square	0.493	Residue	12	88.968	7.414			
Standard error	2.722	Total	13	190.369				
Observations	14							
	Coefficient	Standard error	t-statistics	P-value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Y-intersection	58.704	11.157	5.261	0.000	34.393	83.019	34.3938	83.015
Civil service development index	0.415	0.112	3.698	0.003	0.17	0.66	0.17	0.66

Source: own compilation.

Regression equation:  $y = 58.7 + 0.41x$ . Model interpretation: is as follows if the civil service development index increases by 1%, the value of the SED index increases by 0.41%. The coefficient of determination ( $R^2$ ) is 0.53, meaning that the model explains more than half of the variations in the dependent variable (the SED index). The multiple correlation coefficient (0.73) means that the observed tightness of the statistical relationship between the factors is at a high level. Approximation error of 2.7% means that the model is highly accurate.

The significance of the model was evaluated using Fischer's F-statistics. The coefficient calculated value (13.676) is greater than the table value (0.004 for a given 95% significance level and 12 degrees of freedom); in other words, the regression equation should be considered significant and it can be used for analysis and forecasting. The significance of the regression equation coefficient was estimated using Student's t-statistics. The calculated coefficient value (3.994) is greater than the table value (2.178); therefore, the coefficient values are significant. The P-value of Student's t-statistic for this coefficient (0.003) is less than the significance level  $\alpha = 0.05$ , which also indicates the significance of the model. The confidence interval for the coefficient

calculated with a 95% confidence probability does not contain zero inside it, since the lower and upper 95% bounds of the confidence interval have the same signs.

Testing the model for homoscedasticity, we should check that the condition for the independence of residues is met using the Durbin–Watson statistic using formula 3. The value of the statistic is in the interval between the table values:  $1.045 < 1.082 < 1.350$ . There is a criterion for uncertainty, and the hypothesis that there is no autocorrelation in the series can be either accepted or rejected. In such cases, the first-order autocorrelation coefficient is calculated using formula 4. The value of the coefficient (0.313) indicates a moderate close relationship between the neighboring levels of a number of residues, that is, the property of residues independence is fulfilled.

The index of the region's civil service development, calculated using the formula (2), increased by 15 p.p. during the analyzed period. The largest contribution to the index dynamics was made by the indicators of the share of employees who completed training (index increase by 70% in 2005–2018), and the share of employees in population (ratio decrease by 42%). The level of trust is the only indicator showing a negative trend: if 63% of citizens trusted the regional authorities in 2005, then

the figure made up only 58% in 2018. This indicates the direction of further transformation of the power system – increasing openness to society and accountability.

The revealed correspondence of SED trends of the constituent entity of the Russian Federation and civil service development confirms H.4 hypothesis about the relationship between development of the region and its management system. At the same time, the distribution of the EBs civil servants' number of staff in priority areas does not show a statistically significant dependence on the SED dynamics.

As mentioned above, the values of SED index have decreased in seven priority areas during the last period (2016–2018). While, 16% of a total number of employees is concentrated in the management bodies in these areas, and approximately the same share of employees is employed in the seven industries that showed the greatest growth. In addition, more than 16% of employees are employed in bodies that are not involved in the implementation of priority areas (*Tab. 3*).

Let us make a forecast of public servants' number needed for the implementation of SED

Table 3. Actual and projected number of civil servants in priority development areas of the Russian Federation constituent entity

Priority SED area	Economic growth (2016–2018), %	Number of staff (2019), units	Share in a number of staff (2019), %	Economic growth forecast (2019–2030), %	Projected number of staff (2030), units			Projected share in a number of staff (2030), %		
					Con-serva-tive	Inno-vative	Forced	Con-serva-tive	Inno-vative	Forced
Providing the economy and social sector with efficient labor resources	2.1	8	0.3	131.3	4	2	1	0.2	0.2	0.1
Entrepreneurship and competition development	17.5	7	0.3	142.4	2	1	0	0.1	0.1	0.1
Ensuring the population's quality of life	2.8	138	6.1	129	24	12	5	0.9	0.9	0.8
Investment strategy	21.9	33	1.4	179.1	4	2	1	0.2	0.1	0.1
Public health protection	-9.7	74	3.3	120.8	31	15	7	1.1	1.2	1.0
Development of physical culture and sports	9.1	13	0.6	185.3	30	15	7	1.1	1.2	1.0
Family and sustainable population saving	32.1	162	7.2	163.9	167	81	37	6.1	6.5	5.3
Housing and creating favorable living conditions	22.8	96	4.3	152.4	13	8	3	0.5	0.7	0.5
Integrated spatial development of territories	0.7	5	0.2	145.5	1	1	0	0.1	0.1	0.0
Natural resources and mineral and raw materials base	8.3	106	4.7	168.5	169	66	53	6.2	5.3	7.8
Ensuring environmental well-being and creating the basis of a "green" region	15.7	423	18.8	141.3	333	129	105	12.1	10.4	15.3
Development of comprehensive and additional education	3.2	28	1.2	140.7	22	10	5	0.8	0.8	0.7
Development of professional education and training	-10.5	28	1.2	143.2	23	11	5	0.8	0.9	0.7
Transport and road network	14.1	65	2.9	163.1	70	29	24	2.6	2.3	3.4
Development of scientific and technological potential and innovation sphere	2.2	7	0.3	202	24	12	5	0.9	0.9	0.8
Information technology	-5.7	9	0.4	333.3	160	66	54	5.8	5.3	7.9

End of Table 3

Priority SED area	Economic growth (2016–2018), %	Number of staff (2019), units	Share in a number of staff (2019), %	Economic growth forecast (2019–2030), %	Projected number of staff (2030), units			Projected share in a number of staff (2030), %		
					Con-servative	Inno-vative	Forced	Con-servative	Inno-vative	Forced
Tourism and creative industry	39.0	26	1.2	213.3	84	34	12	3.1	2.8	1.7
Culture, historical, and cultural heritage	-0.9	45	2.0	225.2	226	109	49	8.2	8.8	7.1
Development of export competitiveness and import saving	27.0	7	0.3	100	0	0	0	0.0	0.0	0.0
Development of population's political consciousness, civic activity, and self-realization	21.1	50	2.2	160.8	21	10	5	0.8	0.8	0.7
Population's residence security, and self-preservation	-5.9	71	3.2	142.3	18	9	4	0.7	0.7	0.6
Agricultural and fisheries complexes	5.9	31	1.4	158.2	38	15	12	1.4	1.2	1.8
Trade and consumer market	-2.3	31	1.4	129.1	3	1	1	0.1	0.1	0.1
Development of fuel and energy infrastructure	9.5	71	3.2	119.6	0	0	0	0.0	0.0	0.0
Effective management of land and property complex	-38.2	108	4.8	332.6	829	400	188	30.2	32.2	27.3
Public administration	3.0	78	3.5	165.6	37	18	8	1.3	1.4	1.2
Ensuring the region's financial stability	14.6	113	5.0	338.4	183	79	43	6.7	6.4	6.3
Industry	2.1	8	0.3	154.6	0	0	0	0.0	0.0	0.0
Communications and telecommunications	17.5	34	1.5	129.9	15	6	5	0.5	0.5	0.7
Not participating in the Strategy	7.6	376	16.7	173.2	211	102	48	7.7	8.2	6.9
<i>Total</i>	<i>7.6</i>	<i>2251</i>	<i>100</i>	<i>173.2</i>	<i>2744</i>	<i>1241</i>	<i>687</i>	<i>100</i>	<i>100</i>	<i>100</i>

Source: own compilation.

priorities after calculating the increment of the target values in the Strategy priority areas and put them together with the estimates of productivity growth by industry in the formula (5). The result is shown in *table 3*. A number of the EBs' employees corresponds to the forecast of relevant industries development, which was the main goal of building the model. The correlation coefficient between these parameters varies, depending on the scenario, from 0.77 to 0.82 if  $p < 0.001$ .

Under the conservative scenario of labor productivity growth, a number of employees will have to be increased by 22% in order to meet the planned growth rates of SED in 2019–2030. Implementing such an extensive scenario is not optimal, as it will lead to the increase of

management costs and reputational risks caused by a low level of public trust in the regional authorities, with a downward trend.

Under the innovative scenario, a number of employees will be reduced by 45% by 2030. The planned SED results for the region will be achieved by increasing labor productivity. This scenario will provide maximum level of correspondence between a number of civil servants and the economy growth rate; that is why we consider the innovative scenario optimal.

The forced scenario will reduce the management apparatus by 70%, and employees will be redistributed between the authorities. Thus, the field of land and property relations will concentrate up to a third of a total number of

employees; the apparatus share in the field of information technology will increase from 0.4 to 6%, and in the field of culture – from 2 to 8%. On the contrary, there will be the reduction in such sectors as fuel and energy management, trade, life support, and housing policy. The share of EBs' personnel, not involved in the Strategy implementation, will decrease to 7%. At the same time, it should be noted that the results of reduction depend on the correctness of determining the level of labor productivity and its growth.

### Conclusion and discussion

Addressing the first research task, we evaluated the content, rather than textual compliance of federal and regional documents, and the reflection of national projects in the Strategy, projects, and programs of the region. A common reason for a lack of funds application allocated to the regions for the implementation of the national projects is a lack of such links, which is shown by the experience of these documents implementation in 2018–2019. The results are summarized in *table 4*.

The Strategy and other management tools are highly consistent (maximum compliance is provided in the areas of health, education, and housing policy, and the minimum one is in the areas of innovation and demographic policy). At the same time, regional priorities do not always

correspond to the federal ones, creating risks for the region to lag behind in the management quality ratings. Thus, H.1 hypothesis has been partially confirmed.

Addressing the second task of the study, we revealed that only half of the EBs of the analyzed region participates in the implementation of the national projects and the indicators of Decree no. 193. Involvement in the implementation of the regional Strategy is already much higher (85%). About a third of government agencies implement priority regional projects. This means that H.2 hypothesis is also only partially supported by data. The unclear division of agencies' functional is evident.

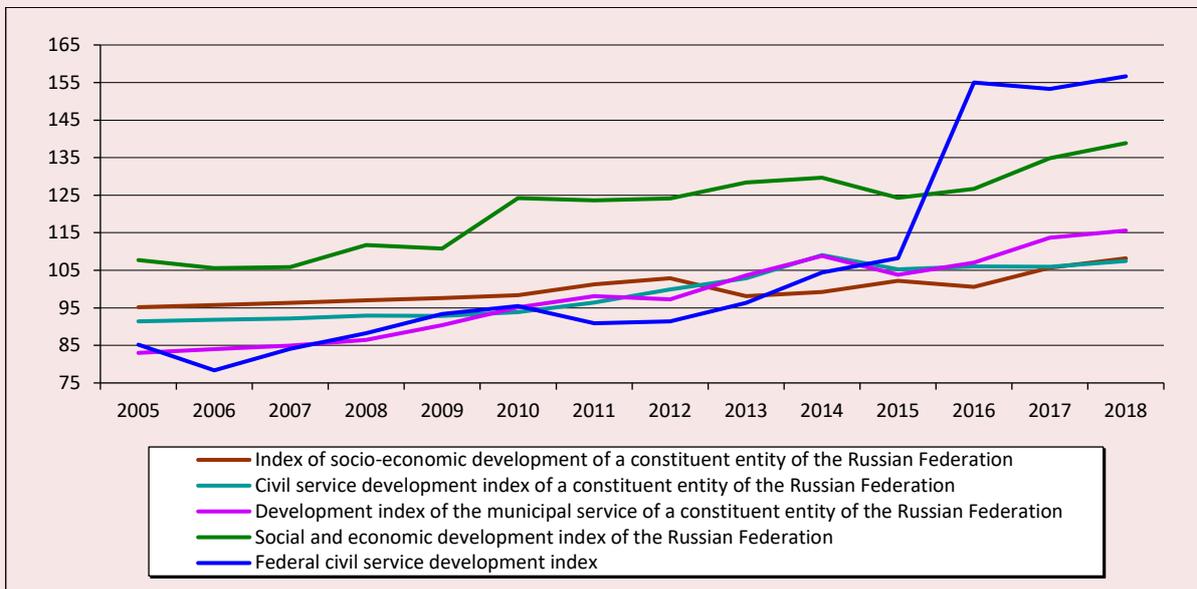
At the same time, we cannot say that there is no relationship between the region's development and the processes in the management apparatus. The calculation of the corresponding indices revealed a strong statistical link between SED and public service development. *Figure 1* shows the relationships of these indices against the background of similar processes occurring at the federal level.

When addressing the third problem, the statistical correspondence of the analyzed indices was evaluated (*Tab. 5*). It is indicative of interconnections between them (the significance of connection is in parentheses).

Table 4. The level of SED management tools compliance, %

Comparison category	Indicators of Decree no. 193	National projects (Order no. 204)	Targets of the Strategy of the Russian Federation constituent entity	Priority regional projects	State programs of the RF constituent entity	Executive bodies of the RF constituent entity
Indicators of Decree no. 193	1					
National projects (Order no. 204)	0.62	1				
Target indicators of the Strategy of the RF constituent entity	0.52	0.72	1			
Priority regional projects	0.65	0.83	0.96	1		
State programs of the RF constituent entity	0.61	0.70	1	0.57	1	
EBs of the RF constituent entity	0.51	0.54	0.85	0.36	1	1
Source: compiled by the author.						

Figure 1. Dynamics of civil (municipal) service development indices, SED RF indices and the RF constituent entity (2005–2018), %



Source: own compilation.

Table 5. Correlation matrix of indices

	SED of a RF constituent entity	Civil service development in a RF constituent entity	Municipal service development in a RF constituent entity	RF SED	Federal civil service development
SED of a RF constituent entity	1				
Civil service development in a RF constituent entity	0.73 (0.003)	1			
Municipal service development in a RF constituent entity	0.84 (0.0001)	0.95 (0.0000)	1		
RF SED	0.85 (0.0001)	0.88 (0.0000)	0.97 (0.0000)	1	
Federal civil service development	0.78 (0.001)	0.76 (0.002)	0.83 (0.0002)	0.76 (0.002)	1

Source: own compilation.

These interconnections may be interpreted as follows:

1. The interconnection of the region’s SED with the municipal service development is stronger (0.84) than with the civil service development (0.73). This is confirmed by the dual regressions calculation. If the civil service development index increased by 15% during the analyzed period, q value of the municipal service development index increased by 30%.

The negative trend is marked in the level of public trust: if 63% of citizens trusted the regional authorities in 2005, this indicator made up only 58% in 2018. This indicates the direction of further transformation of the power system – increasing openness to society and accountability. Without this, all internal improvements in the bureaucratic environment do not lead to the desired result. The level of trust in municipal authorities has been and

remains low (no more than a third of citizens trust them), which means that quantitative improvements do not yet lead to a qualitative increase of local authorities' social efficiency.

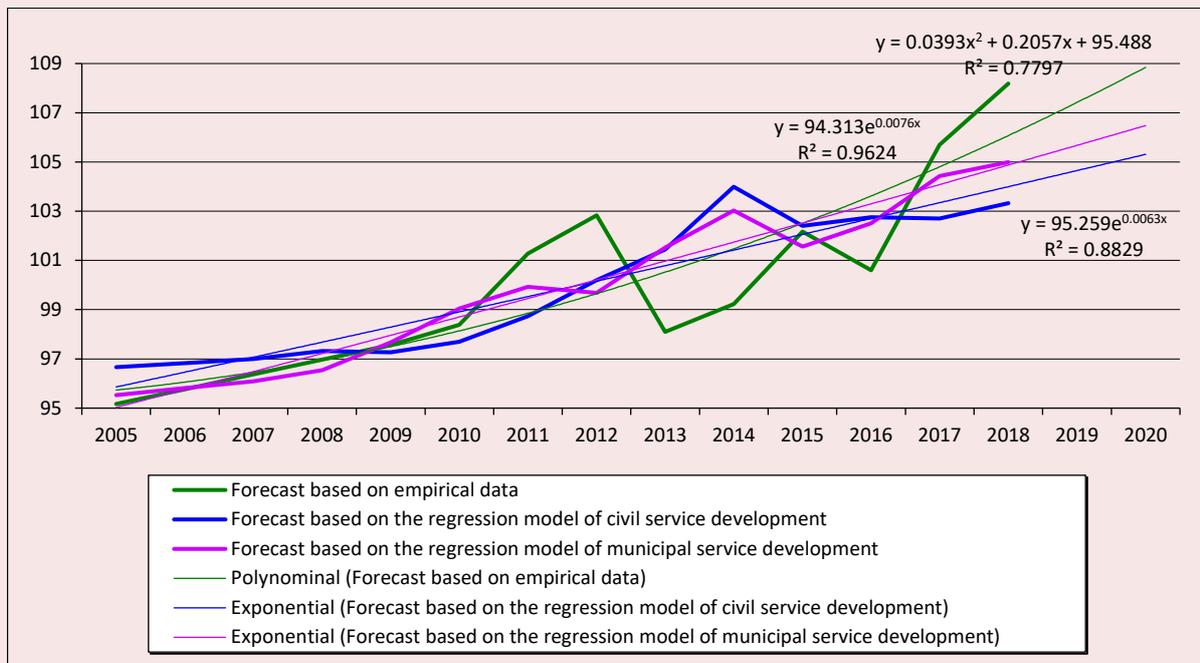
2. There is a significant correlation in the dynamics of the region's SED indices and the country's indices as a whole (0.85). Changes at the regional level can be considered primary, since, while considering the index for the Russian Federation as a dependent variable, the correlation coefficient takes the value of 0.91 with a time lag per year in relation to the dynamics of SED of the constituent entity of the Russian Federation.

3. The interconnection between development processes of the federal and regional civil service is great (0.76). These processes occur in conjunction. Linear regression models, based on the indices of civil and municipal service development, make it possible to predict the dynamics of SED index of the constituent entity of the Russian Federation (Fig. 2).

The interval forecast for two years ahead, based on the regression model of civil service development, is constructed with an approximation confidence value ( $R^2$ ) of 0.88, and it is 0.96 on the regression model of municipal service development (that is, the model for the municipal service development index is more accurate). For comparison, the same trend is based directly on empirical data of SED index of the Russian Federation's constituent entity. The maximum accuracy of 0.78 was obtained using a polynomial trend line by trial and error. Regression analysis tools provide for higher accuracy as they take into account the influence of hidden regressors. The confidence forecast version of SED index value for 2020 varies from 105.1 to 109 with the most likely value of 106.5.

Thus, the test of H.3 hypothesis showed that the share of the Strategy targets that fully or partially correspond to the program of statistical observations is 48.6% (only 22.8% of indicators are fully equivalent). When forming targets

Fig. 2. Dynamics and forecast of SED index of the constituent entity of the Russian Federal



Source: own compilation.

for strategic planning, departmental data is often used, which is easy to manipulate. Consequently, the hypothesis about the correspondence of management tools and statistical indicators was not confirmed.

When developing management tools, the regions are recommended to focus on statistical indicators that are relatively objective and orient the performers to achieve the final socially significant results. The problem with such indicators is that they often describe processes that go beyond the competence of regional authorities. In such a case, the government of a constituent entity of the Russian Federation is recommended to suggest that Rosstat should include the indicator in the federal plan of statistical work. Another problem is the delay in statistical reporting, but it is of a technical nature. When the evaluation of results based on statistics becomes a general principle, it is not difficult to synchronize the timing of receiving statistical data with the government agencies' reports. The Unified Interdepartmental Statistical Information System (UISIS) and the State Automated System "Upravleniye" ("Management") (SASU) have great potential.

Addressing the fourth, and the last task, we found that the distribution of civil servants in the EBs almost does not coincide with the priority areas of the region's development (H.4 hypothesis was not confirmed). The reduction of a number of civil servants also occurs without taking into account the processes in managed industries. Government authorities' focus on achieving development priorities is of great importance, because historically many priorities are not fully achieved due to a lack of interest of the bureaucracy.

To overcome the dysfunction, the author proposed a method connecting the projected government agency staff with SED dynamics and labor productivity growth, which is neces-

sary for the management apparatus to focus on achieving socially significant results. The forecast of the distribution of a number of employees by industry areas under conservative, innovative and forced labor productivity scenarios is visualized in *figure 3*.

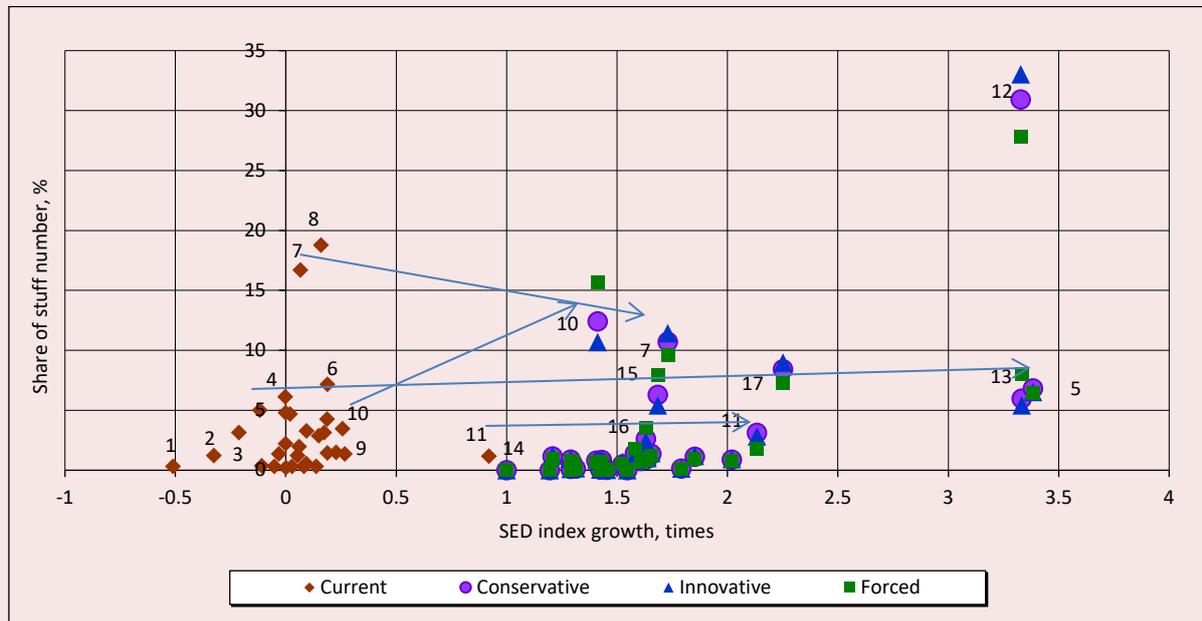
The points in the figure indicate individual priority areas. The coordinate points at the x-axis are the same for conservative, innovative, and forced scenarios, since the Strategy targets are not set on a variable basis. The arrows show the examples of changes in individual industries in 2019–2030. The limitation of the proposed method is the correctness of the Strategy target indicators values, which make up a basis for predicting the dynamics of the region's SED. Randomness or overly ambitious targets can significantly affect the forecast of the employees' number. The likelihood of such a situation is indicated by the weak link between the Strategy goals and statistical indicators.

It is predicted that the management apparatus will be reduced in most industries due to productivity growth (significant reduction is forecasted in industry, energy, foreign trade, and security). The staff of bodies, not involved in the Strategy implementation, is to be reduced. On the contrary, rapidly growing areas (land relations, culture, and information technology) need the increase of a number of civil servants.

In these circumstances, it will probably be necessary to integrate government bodies in the areas where a significant number of employees are to be reduced. We recommend forecasting the staff requirements for priority areas and setting the staff within a total number of areas, taking into account the changes in the government agencies' functions and structure.

The results obtained correlate with the trends of the labor market. The applied forecasting of employees' number will be correct only when the formation of the Strategy targets becomes

Fig. 3. Actual and forecast distribution of civil servants staff number by priority areas of the constituent entity's development



Designations: 1 – professional education; 2 – consumer market; 3 – fuel and energy complex; 4-ensuring the life of the population; 5 – financial sector; 6 – demographic policy; 7 –not participating in the Strategy; 8 – public administration; 9 – agricultural complex; 10 – ecology; 11 – tourism; 12 – land and property complex; 13 – information technology; 14 – export; 15 – natural resources; 16 – transport; 17 – culture.

Source: own compilation.

reasonable, and estimates of labor productivity to those of SED; the recommendations of the dynamics are realistic. Constituent entities of research may be applied in a broad regional the Russian Federation address the tasks similar context now and in the future.

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Received April 23, 2020.