

# SPATIAL DEVELOPMENT OF TERRITORIES BASED ON A SYSTEM OF KEY PERFORMANCE INDICATORS

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## ABSTRACT

*Global competition, competition for markets, and globalization have led to the postulation of meaningful characteristics of national economies based on their macro-efficiency. The relevance of the work is due to the fact that the study of key performance indicators at various levels of industry, regional and national markets contributes to the further development of the country at the international level. Multi-criteria of features, functions and principles of key performance indicators that provide relatively stable competitive advantages and the development of which is a strategic priority, and the resulting synergistic effect may exceed the losses from some lag in other areas of activity. A retrospective and informative content review highlighted the comparative advantages and risks of such a system and its future prospects for the successful development of regions. Also, the theoretical and methodological basis of the study was the fundamental provisions of a number of scientific areas – the theory of world, national and regional competitiveness, the concept of regional archetypes, spatial development, and the General theory of system indicators. The paper uses analytical information from public reports, financial and economic indicators, and foreign statistical data, as well as methods for analyzing the dynamics of socio-economic indicators, comparisons, groupings, and tabular and graphical data visualization techniques. The results of the study can be used by state and local authorities to determine the effective spatial development of territories.*

**Keywords:** *key performance indicators, effects, priorities, strategy, spatial effects, development*

## 1. INTRODUCTION

The current situation of the economic crisis (or panda-economic crisis) in which the whole world lives is a time of hard trials. But for those who know how to ask themselves the right questions, it is also a time of new opportunities. In the near future, the development of society will require other management technologies and indicators that characterize and reveal the state's activity in the new reality. The tasks of increasing the efficiency and effectiveness of management technologies and tools with the help of "Key Performance Indicators" (hereinafter referred to as KPI) are on the agenda (even at the governmental level). An analytical tour of a large number of scientific publications in economic and related disciplines over the past few years shows that scientists around the world are now actively studying and discussing the use

of key performance indicators as a tool to regulate economic and social development, not only at the regional level, but also at the national level. The application of performance measurement systems based on the application of KPI indicators is addressed in the works of R.S. Kaplan, M. Kenerly, C. Clark, C. Cross, R. Lynch, B. Muskel, P. Morris, D.P. Norton, E. Neeley, P. Senge, S. Wilright, R. Hayes and many other scientists. These areas are currently relevant because states are developing under ambiguous and unequal conditions (P. Drucker, E. Grove, C. Kelly). Further development and deepening of theoretical and practical aspects of the research directions is of great importance. R. Aron, J. Bell, J. Galbraith, W. Deidzard, K. Kerr, A. Marshall, W. Rostow, J. Stiglitz, O. Toffler constitute the methodological basis for conceptualizing the development of socio-economic relations in a post-industrial society. The concepts of the "triple helix" and social contract are being developed by J.K. Bertrand, B. Clark, D.A. Kirby, M.H. Irinen-Alestalo, F.S. Parayyad, W.I. Pelthol, T.N. Hernandez, a group led by H. Etzkovitz. The main idea of the KPI is that it can be used to unambiguously and meaningfully assess the performance and effectiveness of any level of activity, including the national one as a whole. The system of indicators makes it possible to reflect the whole spectrum of processes taking place in a state with the help of figures. It is designed to warn of possible problems, both current and long-term. In the majority of modern works KPI is considered as part of the system of balanced indicators of R. Kaplan and D. Norton [8, 9, 10]. However, the inventor of the system for evaluating the achievement of results of the strategy through KPI is a German economist P. Drucker, who more than half a century ago introduced into management practice the concept of "management by objectives" - the concept of management based on the assumption of potential "fruits" of functioning and planning the sequence of their achievement. According to P. Drucker, the definition of KPI should be applied only when the proposed indicators are clearly related to the strategic goal and are created on the basis of its content [3]. However, the use of the concept in literary sources does not always correspond to its initial meaning. Key performance indicators are indicators of the functioning of the State that help to achieve strategic and tactical (operational) goals. With the help of KPI you can plan, as well as monitor the effectiveness and efficiency of the company at various levels of management. Over the last decade, as the market economy develops, the management of domestic enterprises has been increasingly focused on strategic management. Accordingly, the role of the strategic component in management is increasing [10]. At the same time, there is a problem of choosing the most significant indicators, which can really serve as indicators of both current and, first of all, future success of the company, as "efficiency metrics" in the terminology of the Russian economist D. Bougrov [2]. Key Performance Indicators (KPI) concept is used for such indicators in English literature, which is most often translated as "key performance indicators" in Russian literature.

## **2. KEY PERFORMANCE INDICATORS**

For strategic management, the implementation of KPI is important. Key Performance Indicator is a key performance indicator. A key performance indicator system should be consistent with the following main objectives: measure performance in relation to meeting key customer needs; provide clarity on strategic objectives; focus on key processes and critical indicators; signal improvements in performance; identify critical factors requiring attention; provide a clear basis for identifying the achievement of results and appropriate rewards. The KPI system is a tool for measuring objectives. The indicators used to manage and evaluate activities should be clearly linked to the objectives, i.e. formed on the basis of their content. The public management system based on KPI enables the achievement of strategic goals, helping managers to effectively manage available resources in key areas of activity based on information on economic and activity information.

*Table 1: Classification of key performance indicators*

<b>Financial indicators</b> measure the financial performance of the State (levels) (unit, employee).	<b>Non-financial indicators</b> measure the non-financial performance of government (levels)
<b>Quantitative indicators</b> assess the quantitative results of the state's activity (levels) objectively using numbers in certain units (e.g., %, monetary units, tons, kilometers, etc.). To measure quantitative indicators, metric scales are used.	<b>Qualitative indicators</b> assess the qualitative results of state activities (levels) subjectively using judgments (e.g. "very bad", "bad", "good", etc.) and scores (e.g. 1, 2, 3, 4, etc.). Nominal and ordinal scales are used to measure qualitative indicators.
<b>Operational indicators</b> measure the achievement of the State's operational objectives.	<b>Strategic indicators</b> assess the achievement of strategic goals of the state.
<b>Lagging indicators</b> measure time-bound and irreversible state performance.	<b>The leading indicators</b> assess the current and still reversible results of the state's activity.
<b>The performance indicators</b> assess the results obtained by the state (useful and side effects, resource and time consumption) without their relative mutual comparison. They are indicators of the effect or cost of resources.	<b>Performance indicators</b> measure the resulting benefit in relation to the resources or time spent. It is a relative useful effect in one sense or another, received per unit of costs of this or that resource.
<b>Absolute indicators</b> measure the results obtained in absolute terms (denomination) without comparing them with anything (past indicators, total values, resource and time consumption).	<b>Relative indicators</b> measure the results obtained in relative terms (coefficients, indices) compared to anything or indicators of previous periods, total values, resource costs and time.
<b>Functional indicators</b> measure the performance of regular government functions.	<b>Project indicators</b> assess the implementation of national or other state projects (budget compliance, time, quality of project stages and works).

*\*[[https://www.cfin.ru/management/controlling/kpi\\_choice.shtml](https://www.cfin.ru/management/controlling/kpi_choice.shtml)]*

The multicriteria of signs and principles of KPI providing rather steady competitive advantages of the countries which development is strategically priority purposes are revealed, and the received synergistic effect can exceed losses from some lag of other directions of activity of the state. In our opinion, the key indicators of the state are the combination of industrial, energy, production, innovation, financial, infrastructural, scientific and technical activity results, technologies and intellectual resources, which lead to changes in the economy that generate income and to changes in the social sphere in terms of quality of life. At the same time, we define the key indicators of the state as the aggregate set of new knowledge, directions, innovative resources and processes that ensure the functioning (survival) of the state in the short term and development in the long term; they are "invisible" to other countries and are difficult to reproduce, because they should be more than the effects of a particular sector or country; unique to the country itself; important in international strategic decisions, valuable from a commercial and market point of view and development.

### **3. SOME PERFORMANCE INDICATORS IN THE DEVELOPMENT OF ECONOMIES AROUND THE WORLD**

In the case of the state, these indicators should be viewed more as a strategic management tool in the formation and implementation of strategic goals. As a management tool, which allows to project strategic goals to the level of operational management, it is a format of description of

activities with the help of a set of key indicators for each strategic perspective of the state. It allows to do so simultaneously:

- to link the strategic goals with the operational actions, which allow to realize the state strategy;
- to take into account nonfinancial indicators (along with financial indicators), which is necessary to assess the performance of the university, associated with intangible assets and information;
- to maintain a balance between strategic and operational management levels, past and future results, internal and external aspects of activity;
- respond in a timely manner to inappropriate changes in processes by differentiating between indicators that measure achievement and those that reflect the processes to achieve those results.

An important methodological characteristic of this system, in our opinion, is the possibility of its imposition on the activities of the subject at any level, including the national one, taking into account modern combinations of its parameters, expansion of perspective projections and adjustment of hierarchies. Table 2 shows the dynamics of indicators of development of macroeconomics of Azerbaijan in the period 2014-2018.

*Table 2: Dynamics of key macroeconomic indicators of Azerbaijan for 2014-2018*

№	Indicator name	Years					Rejection 2014/2018	
		2014	2015	2016	2017	2018	Difference	%
1.	Number of population, thousand people	9593,0	9705,6	9810,0	9898,1	9981,5	388,5	104,0
2.	Gross domestic product, million manat	59014,1	54380,0	60425,2	70337,8	79797,3	20783,2	135,2
3.	Income of population, million manat	39472,2	41744,8	45395,1	49187,9	53688,6	14216,4	136,0
4.	Fixed assets, million manat	110677,9	124008,4	169120,3	182788,5	193491,0	82813,1	174,8
5.	Investment in fixed capital, million manat	21890,6	20057,4	22706,4	24462,5	25877,0	3986,4	118,2
6.	Average monthly nominal accrued salary, manat	444,5	466,9	499,8	528,5	544,6	100,1	122,5
7.	Government budget revenues, million manat	18400,6	17498,0	17505,7	16516,7	22508,9	4108,3	122,3
8.	State budget expenditures, million manat	18709,0	17784,5	17751,3	17594,5	22731,6	4022,6	121,5
9.	State budget deficit/surplus, million manat	-308,4	-286,5	-245,6	-1077,8	-222,7	85,7	72,2
10.	Savings of population in banks, million manat	7188,4	9473,9	7448,7	7561,2	8375,4	1187,0	116,5
11.	Balanced financial result (profit minus loss) of organizations' activity, million manat	10430,5	-222,5	-1363,4	1684,6	6051,1	-4379,4	58,0

*\*[The State Statistical Committee of the Republic of Azerbaijan. (2020). Retrieved 23.03.2020 from <https://www.stat.gov.az/?lang=en>]*

State budget - a financial document containing the total income and expenditures of the country. It consists of two parts: revenue and expenditure. State revenues consist of tax revenues - property taxes, personal income taxes, turnover taxes such as value added tax (VAT), excise taxes and other fees, corporate income taxes, as well as fines, penalties and other payments. Government expenditures consist of social programs, state apparatus payments, defense expenditures and other items [24]. In 2014-2018, state budget revenues increased by 22.3% and expenditures by 21.5%. The state budget deficit / surplus, on the contrary, decreased by 27.8% and by the end of 2018 the budget deficit amounted to 222.7 million manat. Population and gross domestic product increased by 4.0% and 35.2% respectively. Balanced financial result (profit minus loss) of organizations' activity by the end of 2018 decreased almost 2 times compared to 2014. However, from 2016 it increased by AZN 7414.5 million. This indicates a low rate of economic growth in Azerbaijan. Money income of the population includes payments for labor of all categories of the population, pensions, allowances, scholarships and other social transfers, proceeds from the sale of agricultural products, income from property in the form of interest on deposits, securities, dividends, income of persons engaged in entrepreneurial activities, as well as insurance benefits, loans, income from the sale of foreign currency and other income [6]. This indicator increased by 36.0% during 2015-2018, which indicates the normalization of the financial sector of the country. The indicator of fixed assets increased in 2018 by 74.8% compared to 2014. Such increase is mainly connected with the growth of investments in fixed assets (by 18.2%). Average monthly nominal accrued salary also increased its index by 22.5%, which could affect the growth of the salary fund. The increase in savings in banks by 16.5% indicates an increase in the financial literacy of the population and confidence in commercial banks. Table 3 shows the dynamics of Russia's macroeconomic development in the period 2014-2018.

*Table 3: Dynamics of key macroeconomic indicators of Russia for 2014-2018*

№	RF, macroindicator	Years					Rejection 2014/2018	
		2014	2015	2016	2017	2018	Difference	%
1.	Number of population, thousand people	146267,0	146545,0	146804,0	146880,0	146781,0	514,0	100,4
2.	Gross Domestic Product, billion rubles	79030,0	83087,4	85616,1	91843,2	104335,0	25305,0	132,0
3.	Industrial Production Index, %	101,3	99,2	102,2	102,1	102,9	1,6	101,6
4.	Fixed assets, million rubles	147429656,0	160725261,0	183403693,0	194649464,0	210940524,0	63510868,0	143,1
5.	Investment in fixed capital, million rubles	13902645,0	13897188,0	14748847,0	16027302,0	17595028,0	3692383,0	126,6
6.	Volume of innovative goods, works, services, million rubles	3579923,8	3843428,7	4364321,7	4166998,7	4516276,4	936352,6	126,2
7.	Average labor productivity, in % of the previous year	-	98,9	100,2	101,9	102,3	-	-
8.	Average monthly nominal accrued salary, rub.	32495,0	34030,0	36709,0	39167,0	43724,0	11229,0	134,6
9.	Balanced Financial Results (Profit less Loss) of Organizations' Activities, mln.	4346793,0	7502736,0	12801581,0	9036848,0	12400336,0	8053543,0	285,3

*\*[[https://www.gks.ru/free\\_doc/new\\_site/business/invest/met-inv-fed.pdf](https://www.gks.ru/free_doc/new_site/business/invest/met-inv-fed.pdf)]*

Based on the data presented in Table 1, it can be concluded that the population of the Russian Federation has increased by 0.4 per cent over the last five years and GDP growth by 32 per

cent. One of the factors of GDP growth is inflation: in 2018 it was 4.2 per cent, and in 2014 it was 11.4 per cent [19]. Production index is a relative indicator characterizing changes in production scale in comparable periods. Index of production is used in the analysis of dynamics of physical volume of production [1]. During this period it increased by 1.6%. Labor productivity characterizes the productivity of work, which is measured by the amount of work (production, services) made in a unit of time. By the end of 2018, this indicator reached its maximum value and increased by 3.4%. This indicates an overall increase in the country's production. Fixed assets make up the most important part of Russia's national wealth. Fixed assets are manufactured assets that are to be used repeatedly or permanently for a long period of time, but not less than one year, for production of goods, provision of market and non-market services, for management needs or for provision to other organizations for a fee in temporary possession and use or for temporary use. Fixed assets include buildings, structures, machinery and equipment (workers, power and information), vehicles, working and productive livestock, perennial plantings, and other types of fixed assets [5]. This indicator increased by 43.0% between 2015 and 2018, which is characterized by an increase in production capacity. In official statistical accounting investments in fixed assets represent expenses for construction, reconstruction (including expansion and modernization) of objects that lead to increase in their initial cost, acquisition of machines, equipment, vehicles, production and economic inventory, accounting of which is performed in the order established for accounting investments in non-current assets, investments in intellectual property objects; cultivated biological resources. Investments in fixed assets include expenses for creation and acquisition of new fixed assets, as well as imported assets, which are made at the expense of all sources of financing, including budget funds on a refundable and non-refundable basis, loans, technical and humanitarian assistance, exchange contracts [17]. In the last five years, the figure has increased by 26.6%. The Science section contains statistical information on the main indicators characterizing the state and level of development of Russia's scientific potential. It provides information on the number of organizations engaged in scientific research and development, number and composition of employed personnel, training of scientific personnel, expenditures on civil science from the federal budget, internal expenditures on research and development [23]. The volume of innovative goods, works and services increased by 26.2% in 2018 compared to 2014. This indicates the innovative development of the country. Average monthly nominal accrued salary of employees is calculated monthly based on the results of continuous and sample statistical observations made with different periodicity, on the basis of information received from organizations of all types of economic activities and all forms of ownership, and is determined by dividing the fund of accrued salary of employees by the average number of employees and the number of months in the reporting period. The payroll includes amounts of wages and salaries accrued to employees in monetary and non-monetary forms (including personal income tax and other deductions in accordance with Russian legislation) for worked and non-worked hours, compensation payments related to working hours and working conditions, additional payments and allowances, bonuses, lump-sum incentives, as well as payments for food and accommodation, which are of a systematic nature [14]. The average monthly nominal accrued salary increased by 34.6% in 2018 as compared to 2014. Balanced financial result (profit minus loss) - the final financial result identified on the basis of accounting of all business operations of organizations is the sum of balanced financial result (profit (+), loss (-)) from the sale of goods, products (works, services), fixed assets, other property of organizations and other income reduced by the sum of other expenses. This indicator has more than doubled over the period 2014-2018, which indicates the effectiveness of the state. We consider it mandatory to introduce social indicators of the quality of life of the population such as housing, health care, education, transport and communications, culture and sports, recreation and tourism, etc.

#### 4. CONCLUSION

The research made it possible to clarify the interpretation of the term KPI in terms of government activities. Key indicators of the state is a combination of industrial, energy production, innovation, financial, infrastructure, the results of scientific and technological activities, technologies and intellectual resources, which lead to changes in the economy that generate income and to changes in the social sphere in terms of quality of life (housing, health, education, access to the Internet, culture, tourism). At the same time, the key indicators of the state are defined by us as a complex of new knowledge, directions, innovative resources and processes, which ensures functioning (survival) of the state in the short term and development in the long term; they are "invisible" for other countries and difficult to reproduce, as they should be more than the effects of a single sector or country; unique for the country itself; important in making international strategically important decisions, valuable from a commercial and market point of view and development. In addition, the lower hierarchical level of key performance indicators is the system of financial and non-financial indicators, which are indicators of performance in achieving the strategic objectives of the state, allowing tactical management based on developed intermediate operational indicators. The KPI system should be applied only when the proposed indicators are clearly linked to the strategic goal and are formed on the basis of its content. We consider it expedient to use KPI for operational management by constructing intermediate operational indicators based on the key strategic indicator (KPI itself), calculated for the current period of time. The use of KPI and indicators developed on their basis of intermediate goals and objectives of the state allows, on the one hand, to track progress towards a strategic goal, on the other hand, it is a tool for tactical management and timely corrective decisions on the way to achieve strategic objectives.

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