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Instruments to assess efficiency of implementation of the strategy of scientific and technological development of the Russian Federation

Instrumentos para evaluar la eficacia de la aplicación de la estrategia de desarrollo científico y tecnológico de la Federación de Rusia

Alexander Emelyanovich MILLER 1; Sergey Valentinovich KUZNETSOV 2; Yulia Ivanovna RASTOVA 3

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Content

ABSTRACT:

The article examines high-priority tasks that ensure successful implementation of the Strategy of the scientific and technological development of the Russian Federation, which has determined the transition of the socio-economic development of the country to the Grand Challenge model. These tasks include organization of monitoring the implementation of the Strategy and projects of the National Technological Initiative (NTI), as well as control over the progress of the plan of implementation of the Strategy and NTI roadmaps, performance of Russian enterprises engaged in research and development. The authors' operational hypothesis is the need to form a system of assessing the efficiency of the implementation of the Strategy of scientific and technological development (STD), which corresponds to a configuration of the vertical system of strategic planning in this area. The reasonability of

RESUMEN:

El artículo examina las tareas de alta prioridad que aseguran el éxito de la aplicación de la Estrategia de desarrollo científico y tecnológico de la Federación de Rusia, que ha determinado la transición del desarrollo socioeconómico del país al modelo Grand Challenge. Estas tareas incluyen la organización del seguimiento de la aplicación de la Estrategia y los proyectos de la Iniciativa Tecnológica Nacional (NTI), así como el control sobre el progreso del plan de aplicación de la Estrategia y las hojas de ruta, . La hipótesis operativa de los autores es la necesidad de formar un sistema de evaluación de la eficiencia de la implementación de la Estrategia de Desarrollo Científico y Tecnológico (STD), que corresponde a una configuración del sistema vertical de planificación estratégica en esta área. La justificación de la utilización de la experiencia adquirida en la aplicación de un enfoque orientado al objetivo en

using the experience gained in the implementation of target-oriented approach in public administration for this purpose is justified – in particular, the experience in the field of assessing the efficiency of the implementation of federal and departmental target programs and compiling national ratings and systems of the corporate key performance indicators.
Key words: Strategy of the scientific and technological development of the Russian Federation, National Technological Initiative, roadmap, efficiency of implementation, assessment indicators

la administración pública con este fin está justificada, en particular, la experiencia en el ámbito de la evaluación de la eficiencia de la ejecución de programas públicos federales y departamentales y la compilación de calificaciones nacionales y De los principales indicadores de rendimiento corporativos.
Palabras clave: Estrategia del desarrollo científico y tecnológico de la Federación de Rusia, Iniciativa tecnológica nacional, hoja de ruta, eficiencia de la aplicación, indicadores de evaluación

1. Introduction

At the G20 meeting on September 5, 2016, the concept was formulated as the Contours of innovative growth of the "Group of Twenty", where a central place was devoted to innovations in the science and technology field as to a factor playing a fundamental role in contributing to economic growth, supporting the creation of new jobs, entrepreneurship and structural reforms, as well as improving productivity and competitiveness.

Aggravated geopolitical rivalry determines the need to take advantage of the historic opportunity for growth, national security efforts, improvement of living standards and development of the branches of the new technological order, which are opened up by the technological progress.

In the strategic context, it is difficult to overestimate the significance of the "Strategy of the scientific and technological development of the Russian Federation" (STD Strategy) adopted in late 2016 (Decree of the President of the Russian Federation dated December 1, 2016 No. 642). Innovations are integral to the complex process of formation and implementation of the strategy of all the market participants, while innovative development cannot be understood outside the context of their operation, apart from the people that determine their strategy (The State and the Market, 2010).

The document names persistent inconsistency of priorities and instruments to support STD at the national, regional, sectoral and corporate levels as one of the unsolved problems of the STD in the Russian economy (Decree of the President of the Russian Federation dated December 1, 2016 No. 642). Activities in the framework of the Strategy must ensure the implementation of national priorities formulated at the federal level, integrity and unity of the country's STD. Since then, the sectoral documents of the strategic planning in the field of STD, state program of the Russian Federation and its subjects, as well as planning and target-oriented documents of the partially government-owned companies should be developed on the basis of the approved STD Strategy. As such, the configuration of the vertical system of strategic planning in this area will be formed, providing an opportunity to its efficient state regulation.

The STD Strategy defines the place of the National Technology Initiative (NTI) as one of the key instruments to transform fundamental knowledge, search and applied research into products and services for the long-term leadership of Russian companies on the global market. The NTI was designated as one of the priorities of the state policy for the first time in the Presidential Address to the Federal Assembly on December 4, 2014.

NTI is a long-term complex program to set the conditions to ensure the leadership of Russian companies on the new high-tech markets, which will determine the structure of the world economy in the next 10-20 years. The STD implementation must ensure significant changes in the branches in its area of implementation, as well as the formation of markets for new products (EnergyNet, FoodNet, SafeNet, HealthNet, AeroNet, MariNet, AutoNetFinNet, NeuroNet) with a stable long-term socio-economic effect.

NTI is designed to combine the efforts of business representatives, researchers and developers able to develop and use the most advanced technology in order to find out what barriers need to be removed and what kind of support they require.

2. Methodology

The target-oriented approach to management is broadly defined as a way to solve large and complex problems through the development and implementation of the complex of target measures aimed at goals the achievement of which ensures a solution to the arisen problems (Kuznetsov and Neustroev 2012; Rumyantsev 2014). It follows from above definition that the essential features of the problems that require solution through the target-oriented means include complexity, scale, urgency, polysystematicity, informativeness, complex nature of the decision-making processes, actual impossibility to solve the problem with traditional methods, without centralization, concentration, additional resource mobilization, use of specific forms and methods of arrangement, management and provision of state support (Kuznetsov and Neustroev 2012).

Undoubtedly, both a plan of measures to implement the STD strategy and NTI plans of measures ("roadmaps") have all the above features. Like any programs, they are not just an instrument of planning. We must mention the unity of their substantial part with the formation and use of organizational and financial implementation and control mechanisms. In particular, "Russian Venture Company" is endowed with the functions of the STI project office, including project management, organizational, technical, expert and analytical support, information and financial support for the development and implementation of "roadmaps" and NTI projects, as well as monitoring of the latter.

Management of innovative activity through the programs of innovative development (PID) has already become one of the areas of strategic planning in the majority of large domestic companies partially owned by the government (Kuznetsov and Rastov, 2015; Gershman and Thurner, 2016). The systematic assessment of PID efficiency is carried out in the form of monitoring of their development, adjustment and implementation. Employee motivation systems are formed using the results of monitoring (Kuznetsov and Rastov 2015)

The project-based approach, new for the local practice of the state regulation, is provided in the organization of monitoring and control of changes in the NTI projects.

At the same time, the only task was set to establish a list of indicators of achievement of the level of progress in the implementation of the STD Strategy. The Government of the Russian Federation is charged with control over the implementation of the plan of measures to implement the Strategy, but the procedure has not been established.

Unfortunately, recommendations to the public authorities of the subjects of the Russian Federation to "be guided by the provisions of the STD Strategy in implementing the operation in this field, providing for the necessary changes to the state programs of the subjects of the Russian Federation" (Decree of the President of the Russian Federation dated December 1, 2016 No. 642) so far have only a framework nature.

The methods of project management of innovative projects of the partially government-owned companies that implement PID, with a phased monitoring of process of their implementation and justification for corrective actions, have yet to be implemented.

Finalization of development of the mechanism of assessing the efficiency of implementation of the STD Strategy at all levels of the vertical system of strategic planning requires maximization of the use of accumulated experience of assessing the efficiency of the federal and departmental target programs, construction of national ratings and systems of the corporate key performance indicators.

3. Results of research

The suggested configuration of the system of assessing the efficiency of the implementation of the STD Strategy is shown in Table 1.

Table 1. System of assessing the efficiency of the implementation of the Strategy

of the scientific technological development of the Russian Federation

Level in the vertical system of strategic planning	Assessment instrument	Factors to be assessed
Monitoring of implementation of the STD Strategy	Expert and analytical report	• Impact of science and technology on the socio-economic development of the country according to the Grand Challenge model. • State and performance of the field of science, technology and innovation. • Quality of the state regulation and service provision of scientific, technical and innovative activity.
Assessment of accomplishment of the plan of measures to implement the STD Strategy	Assessment of the performance of the heads of the federal executive bodies and senior officials of the subjects of the Russian Federation in the implementation of the STD (NTI) plan of measures	• Comprehensive application of principles, areas and measures of the state policy in the field of STD. • Creation of mechanisms to detect and update grand challenges. • Achievement of results on the STD priorities defined by the Strategy.
Assessment of accomplishment of the NTI plan of measures ("roadmap")		• Creation, development and promotion of advanced technology, products and services that ensure priority positions of Russian companies on the shaping global markets. • Gradual improvement of the legal framework to eliminate barriers when using the advanced technology and establishment of a system of incentives for their implementation. • Improvement of the education system to meet the prospective staffing demands of the dynamically developing companies, scientific and creative teams involved in the creation of new global markets. • Development of the system of professional communities and popularization of NTI. • Organizational, technical, expert and analytical support, information provision of NTI.
Monitoring of implementation of NTI projects	Reporting: - monthly; - in the framework of the contract with the recipient of support; - following the results of the completion of the project stage; - annual; - following the results of the project completion	• Achievement of milestones. • Achievement of targets. • Execution of funding timeline. • Project risks. • Integral assessment of the project.

Monitoring of PID of the partially government-owned companies	Recommendations for executive bodies that exercise shareholder rights or represent the interests of the Russian Federation in the organization	• Achievement of targets of labor productivity and creation of high-performance jobs (Decree of the President of the Russian Federation dated May 7, 2012 No. 596). • Omission of outdated and inefficient technology, transition to the principles of the best available technology. • International leadership in relation to similar foreign and international companies. • Expansion of exports of goods and services. • Long-term investment in fundamental and applied research and development. • Integration with the plan of measures ("roadmaps") of NTI and programs of import substitution.
Monitoring of the innovative projects of the PID of the partially government-owned companies	Key indicators of efficiency of the scientific and technical branches, individual managers and specialists	• Creative activity of the branches and employees at the stage of the project initiation. • Reducing the gap between target and actual values of the project parameters at the control points during implementation. • Efficiency of the scientific and technical activities of the company.

When it comes to the assessment of implementation of the plan of measures for implementation of the STD Strategy or the NTI plan of measures ("roadmap"), it is important to consider two circumstances:

1) due to their programmatic nature, these plans include not just interrelated projects, the management of which is advisable to coordinate in order to achieve advantages and the degree of control that are not available if managing them separately, but also cyclic organizational, informational and other measures beyond the individual projects – organizational, technical, expert and analytical support, information and financial provision;

2) achievement of goals and tasks (significant control results) of the plans of measures must be assessed taking into account the actual level of budget spending allocated to implement them over the reporting period (year).

The achievement of goals and tasks (significant control results) at the actually achieved level of budget spending allocated to achieve them can be assessed using the following algorithm.

Each specific goal or task of the plan of measures is estimated by the indicator (I_i), which is calculated as follows:

– if a positive result is taken as excess of the actual figure over the target, the efficiency indicator is:

$$I_i = \frac{i_{actual}}{i_{target}} \cdot 100, \qquad (1)$$

where i_{actual} is an actual value of the indicator;

i_{target} is a target value of the indicator;

– if a positive result is taken as a decrease in the actual indicator as compared to the target, the calculation is as follows:

$$I_i = \left(\frac{i_{actual}}{i_{target}}\right)^{-1} \cdot 100. \qquad (2)$$

Performance indicators are a score corresponding to the degree of achievement of the result indicator.

Assessment of execution of tasks provided in the target is calculated as follows:

$$I_{tasks} = \frac{\sum_{i=1}^{n} I_i}{n}, \qquad (3)$$

where I_{tasks} is a total value of execution of the indicators of the program tasks; n is number of tasks in the plan of measures.

The indicators of achievement of the goals of the plan of measures are calculated in a similar manner.

Calculation of the integral value of the indicator of efficiency of implementation of the plan:

$$R_{plan\,of\,measures} = L_1 \cdot I_{goals} + L_2 \cdot I_{tasks}, \qquad (4)$$

where $R_{plan\ of\ measures}$ is an integral assessment of the plan of measures; L_1 is a weighting coefficient assigned to the goals of the plan of measures; I_{goals} is a value of the assessment of indicator of the goals of the plan of measures; L_2 is a weighting coefficient assigned to tasks (significant control results); I_{tasks} is a value of the assessment of indicator of the tasks of the plan of measures.

The actual level of budget spending allocated for implementation of the plan of measures can be taken into account through adjusting the values of the weighting coefficients.

4. Discussion of results

The following conclusions can be made based on the assessment of efficiency of implementation of the plan of measures or "roadmaps":

- score of 90 and higher – "efficient implementation";

- score from 50 to 90 points – "insufficiently efficient implementation";

- score of less than 50 points – "inefficient implementation".

The proposals to adjust the goal, task and list of measures of the plan, cutbacks to funding, early termination, etc. can be formulated following the results of the assessment of efficiency of implementation of plans of measures on the implementation of the STD Strategy and the NTI plans ("roadmaps").

The authors believe that the development of instruments to support the STD on the regional and sectoral levels should be guided by the following considerations.

Support for the STD at the sectoral level should focus on the following areas:

– improving the quality of patent and licensing activities (as in well-known, departments responsible for this activity are completely shut down at some enterprises), support of patenting the industrial property abroad;

– standardization and accelerated development of technical regulation;

– support to business in implementing quality management systems, expansion of principles of lean manufacturing;

– raising the prognostic level of sectoral foresights;

– introduction of production asset management systems based on the assessment of technical condition and risks, etc.

The policy assuming the concentration of resources for innovative development of certain territories (such as Far East in Russia, including the establishment of an innovation center on Russky Island) and aimed at promoting the development of rare innovative regional clusters only aggravates the isolation of the defense-oriented territories and structural imbalances in the allocation of innovative potential, as well as prevents the involvement of regions in scientific, innovation and educational environment.

Resolution of many problems related to competence of the regions (depreciation of physical infrastructure and housing, high unemployment rate and lack of job security in the future, poor scales of realization of entrepreneurial initiative, poor quality of service in the social sphere and adverse environmental setting) secures demand for advanced technology, products and services for the long term (Gusakov 2014; Rumyantsev 2015).

In our opinion, a need has emerged for:

– the launch of a regional innovative standard based on preparation of target models of best practices of successful regions;

– the formation of management teams capable of implementing such models of best practices in the subjects of the Federation;

– the establishment of the National rating of the state of the STD in the regions and its science-based parameterization.

Today, the following must be noted:

– None of the regions has a comprehensive legal and regulatory framework to support the STD;

– Most regions have not defined and regulated the list of priority areas of the STD;

– No indicators of the STD are present in the assessment of performance of the executive authorities of the Russian Federation (for example, the indicator "Share of innovative products, works and services in the total volume of shipped products, works and services" can be used for these purposes).

It will be fair to say that the Institute for Statistical Studies and Economics of Knowledge of the National Research University "Higher School of Economics" publish the "Rating of innovative development of the subjects of the Russian Federation" annually in the form of an analytical report (Gokhberg 2016). According to the methodology of the "Rating...", the quality of

innovation policy is defined by the availability of the strategy of innovative development, coordination bodies on innovation policy, areas of the priority development of innovative activity, specialized programs of state support for innovation, and a number of other indicators. However, before assigning the national status to this type of rating and include its target indicators in the system of assessment of the performance of the heads of the federal executive bodies and senior officials of the Russian Federation, a broad expert discussion of its concept, methodology and parameters is required.

5. Conclusion

As such, immediate coordinated action is required today in order to accord priorities and instruments of the STD support at the national, regional, sectoral and corporate levels by completing the formation of the configuration of the vertical system of the STD strategic planning with the subsystem of assessment of efficiency of the implementation of the STD Strategy. Unity of strategic foundations and software tools for their implementation will allow to solve the problems of creation, development and promotion of advanced technologies, products and services, to remove barriers and create incentives for the own radical technological innovations, identify perspective staffing needs of new global markets, and to stimulate the development of a system of professional associations.

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1. Dostoevsky Omsk State University, 644077, Russian Federation, Omsk, Prospekt Mira, 55a. Email: aem55@yandex.ru

2. Institute of Regional Economy of RAS, 190013, Russian Federation, St. Petersburg, Serpukhov str., 38
3. Saint Petersburg State University of Economics, 191023, Russian Federation, St. Petersburg, Sadovaya str., 21

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