Ecosystem of sectoral management as a tool for implementing state energy policy (experience of oil companies)

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Abstract. In this paper, the author's approach to the definition of the concept of an ecosystem of sectoral management is proposed, the possibility of introducing this concept into the system of state regulation of oil companies and the industry as a whole is considered. The article describes the main indicators included in the process-project model of sectoral management, which is the center of the concept of the sectoral management ecosystem, provides a methodology for calculating and monitoring these indicators, and analyzes the benefits of implementing this concept in the state regulation system.

1 Introduction

In today's turbulent external environment, the traditional methods of state sectoral management of oil companies (federal targeted programs, budgetary and tax instruments, administrative regulations, etc.) have a number of serious limitations. Firstly, these are the existing contradictions between the short-term and long-term goals of the state and oil companies, which creates an imbalance in industry development in the process of implementing regulatory functions. Secondly, the inconsistency of a number of adopted state and corporate decisions with the provisions of the Energy Strategy of the Russian Federation, as well as the lack of mechanisms for coordinating the provisions of various federal target programs and projects with each other. Thirdly, at present, sectoral management in the oil sector is carried out practically without the use of the methodology and tools of process management, based on the project approach and "manual" management.

The state faces the problem of developing a more efficient system of state sectoral management of oil companies and the Russian oil industry as a whole.

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Thus, the aim of the study is to develop a comprehensive concept of the ecosystem of sectoral management of oil companies in Russia and substantiate the need for its implementation in the process of implementing energy policy.

2 Materials and methods

To solve the described problem, it is proposed to introduce the concept of "ecosystem of sectoral management of oil companies". Before revealing the essence of this concept, it should be noted that in modern science the term "ecosystem" is used in various contexts to describe the various functions of economic systems. In the academic literature, the most common definition of the concept of an ecosystem is associated with the so-called entrepreneurial ecosystems, i.e. communities with interacting within them organizations and individuals from the world of entrepreneurship [4-6]. The further spread of the term "ecosystem" is associated with the development of innovations. Some authors emphasize that the effective development of any business structure is associated with the active introduction of innovations - technological, technical or managerial [3, 7]. The evolution of the concept of "Entrepreneurial ecosystem" is considered in more detail in the work of S.V. Doroshenko and A.G. Shelomentsev [1].

In the business community, the term under consideration is most often understood as a combination within one global service of various microservices that allow consumers to satisfy their various needs as part of a subscription or membership in the community. Similar ecosystems are built by the largest Russian banks and IT companies - Sberbank, Yandex, Tinkoff and others. The main goal of creating such entrepreneurial-technological ecosystems is to generate maximum traffic and increase the number of transactions within a large conglomerate of interconnected services, which ultimately leads to maximization of the company's profit.

By analogy with the concepts of "entrepreneurial ecosystem" and "innovation ecosystem", as well as in the development of the above concepts, it is proposed to consider the concept of "ecosystem" not only in relation to technologies and participants, but also to the management process.

Under the ecosystem of industry management of oil companies, it is proposed to understand the community of regulatory and coordinating units of the meso-space that have an organizational and managerial impact on industry micro-institutions using process, project and other management mechanisms.

Thus, the introduction of the concept of an ecosystem of industry management into scientific and business circulation will make it possible to combine the classical organizational and economic mechanisms of state regulation and management with a set of disparate actions and processes that also have a significant impact on both individual oil companies and the industry as a whole. An example of such actions and processes that do not fall under the classical definition of the concept of “management mechanism” is management based on the cluster approach and cluster initiative, the use of state-owned companies to influence the industry or other companies, integration processes as a tool to influence the market, use of the potential intersectoral interaction in the industry, etc.

An integral part of such an ecosystem of sectoral management is the previously described process-project model of sectoral management [2].

To form a comprehensive process-project model for managing the oil industry in Russia, it is necessary to clearly define its main indicators, criteria for evaluating efficiency, and develop a roadmap for the transition to the specified model of sectoral management.

Let us turn to the indicators included in the process-project model of the sectoral management ecosystem (Table 1).
Table 1. Indicators of the process-project model of the sectoral management ecosystem.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Evaluation parameters</th>
<th>Data source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicators already used in sectoral management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulations</td>
<td>Quantity, content and directions of regulation</td>
<td>Government of the Russian Federation</td>
</tr>
<tr>
<td>National projects, FTPs, national programs</td>
<td>Quantity, content and directions of regulation</td>
<td>Government of the Russian Federation</td>
</tr>
<tr>
<td>Departmental projects</td>
<td>Quantity, content and directions of regulation</td>
<td>Ministry of Energy of the Russian Federation</td>
</tr>
<tr>
<td>Taxes, fees, duties, tariffs</td>
<td>Rates, calculation formulas, benefits</td>
<td>Government of the Russian Federation</td>
</tr>
<tr>
<td>Quotas, licenses</td>
<td>Rates, calculation formulas, benefits, conditions for obtaining</td>
<td>Government of the Russian Federation</td>
</tr>
<tr>
<td>Regulations</td>
<td>Quantity, content and directions of regulation</td>
<td>Ministry of Energy of the Russian Federation</td>
</tr>
<tr>
<td>Integration processes in the industry</td>
<td>Number of mergers and acquisitions, indices CR-3, HHI, HT, Linda</td>
<td>Reporting of industry entities</td>
</tr>
<tr>
<td>Monitoring of the activities of companies with state participation (KSU)</td>
<td>Participation of KSU in integration processes, influence of KSU on the development of the industry, preferences and benefits for KSU</td>
<td>KSU reporting</td>
</tr>
<tr>
<td>Formation and development of clusters</td>
<td>Number of industry clusters, volume of products manufactured by cluster members</td>
<td>Ministry of Economic Development of the Russian Federation, Ministry of Industry and Trade of the Russian Federation</td>
</tr>
<tr>
<td>Intersectoral and intersectoral interaction</td>
<td>Availability of joint expert groups on regulatory impact assessment, participation of representatives of NGOs, science, business and the expert community</td>
<td>Ministry of Energy of the Russian Federation, Coordinating Council for Intersectoral Cooperation.</td>
</tr>
</tbody>
</table>

It is important to note that only the first group of indicators is currently used as tools for sectoral management of the Russian oil industry. The second group is currently a set of individual actions, processes and events carried out by various subjects of the economic system without coordination and assessment of their impact on the sectoral management system. When these indicators are introduced into the process-project model and given the status of industry management tools, it becomes possible, firstly, to predict the impact on regulatory processes in the industry, and secondly, to use them as mechanisms for indirectly influencing the industry and obtaining additional effects.

3 Results

Effective sectoral management includes clearly defined goals and objectives, as well as coordinated interaction of all management entities, regardless of the mechanisms that they use in the course of their activities. The importance of the transition to a process-project model of sectoral management of the oil industry in Russia is associated with an increase in the number of tools and mechanisms for state regulation and coordination, the complexity of the structure of business and capital ownership, as well as a significant increase in the number of environmental factors required to be included in forecast management standards. In addition to the general coordination of the management tools used, the functions of the
process-project model of sectoral management include the development of process management standards, comprehensive coordination and management of project portfolios while maintaining and transforming current activities, taking into account the goals and results of ongoing projects. This sectoral governance model is a powerful tool in the hands of ministers or managers at any other level to ensure that accurate information is available to executive management, thus maintaining visibility and control over the effectiveness of decisions.

To assess the effectiveness of the formation and implementation of the process-project model of sectoral management, it is proposed to adopt the following key performance indicators.

For each new indicator included in the process-project model, it is proposed to select several key target indicators, as well as assign a certain specific weight to each indicator. Thus, such a technique will allow, with a certain periodicity, to evaluate the integral index of the effectiveness of using the maximum set of tools of the process-project model. Table 2 presents the indicators, performance measures and weights.

Table 2. Model Performance Indicators and Metrics.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Quantitative indicators</th>
<th>Specific gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration processes in the industry</td>
<td>Number of mergers and acquisitions</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>Amount of mergers and acquisitions, billion rubles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Share of transactions in the country's GDP, %</td>
<td></td>
</tr>
<tr>
<td>Activity monitoring</td>
<td>Number of KSU in the industry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indicator of the average comparative efficiency of KSU activities (range from 0 to 1)</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>Compliance of KSU activities with OECD principles (0 - does not comply, 0.5 - partially, 1 - fully complies)</td>
<td></td>
</tr>
<tr>
<td>Formation and development of clusters</td>
<td>Number of industry clusters</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>Number of organizations included in the industry cluster</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indicator of the average comparative efficiency of cluster activity (range from 0 to 1)</td>
<td></td>
</tr>
<tr>
<td>Intersectoral and intersectoral interaction</td>
<td>Share of industry products in MOB, %</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>Number of intersectoral coordinating councils in the industry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Share of proposals from businesses and the third sector in the adopted regulations, %</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OECD Disclosure Compliance</td>
<td></td>
</tr>
</tbody>
</table>

To calculate and summarize indicators with different dimensions, it is advisable to calculate normalized indicators using the formula:

\[ R = \frac{X_i - X_{\text{min}}}{X_{\text{max}} - X_{\text{min}}}, \]  

If the best indicator has the highest value;

\[ R = \frac{X_{\text{max}} - X_i}{X_{\text{max}} - X_{\text{min}}} \]  

If the best indicator has a minimum value.

In this case, \( X_i \) is the value of the estimated indicator in the specified period, \( X_{\text{min}} \) and \( X_{\text{max}} \) are the minimum and maximum values of the indicator for the specified period.

Thus, the definition of key quantitative indicators for each new indicator will make it possible to track the procedure for the formation and implementation of the maximum number of indicators in the management system based on the process-project model. With a
frequency of once a year or once every six months, it is possible to calculate the integral index \( R \), the growth of the value of which will mean an increase in the indicators of the model.

It is important to note that such monitoring can be carried out both in the context of the whole country and in individual regions. However, the disadvantage of the described model, as well as of all integral indices, is excessive generalization and aggregation of all input parameters. As a result, a situation may arise when the integral index grows, for example, only due to the growth of one of the indicators, which can create an imbalance in sectoral management tools and lead to incorrect functioning of the model. To minimize the risks associated with such a possible development of the situation, it is proposed to separately monitor each key performance indicator in each indicator.

The calculation method is based on the initial calculation of the average growth rate of the selected parameters according to the formula:

\[
T_{np} = \frac{k_{n+1}}{k_n}
\]  

(3)

Where \( T_{np} \) is the parameter growth rate; \( k_n \) – parameter value for year \( n \); \( k_{n+1} \) – parameter value for the year \( n+1 \).

This model also takes into account the presence among the key indicators in each of the indicators of such data that have an inverse relationship. The following formula is applied to such indicators:

\[
T'_{np} = 2 - \frac{k_{n+1}}{k_n}
\]  

(4)

Further, it is possible to calculate the average growth rate of all indicators included in one indicator, i.e. dynamic movement of not all indicators, but of a single indicator, taking into account changes in all indicators included in it:

\[
E_p = \frac{1}{n} \sum_{1}^{n} T_{np}
\]  

(5)

Where \( E_p \) is the average growth rate for one indicator.

Based on the previous calculations, in order to form a single general value for the growth rate of the number of tools introduced into the process-project model, we can present the final formula:

\[
E_d = \frac{1}{n} \sum_{1}^{n} E_p
\]  

(6)

Where \( E_d \) is the average growth rate of the use of the tools of the process-project management model.

4 Discussion

The transition to the concept of an ecosystem of industry management of oil companies, as well as the introduction of a process-project model within its framework, will make it possible, firstly, to optimize the tools of state regulation of both the industry as a whole and
organizations and enterprises in this area in particular, and secondly, create a tool for coordinating and evaluating the regulatory impact of various federal targeted programs, projects, concepts for the development of an enterprise from the point of view of the long-term strategic interests of the state in the oil sector. The inclusion of new tools and mechanisms of influence on companies and the industry into the perimeter of the sectoral management ecosystem will increase the speed, quality and efficiency of government decision-making in the oil industry.

Figure 1 shows the stages of implementation of the program for introducing the process-project model into the sectoral management ecosystem.

![Fig. 1. Stages of introducing a process-project model into the ecosystem of sectoral management.](image)

5 Conclusion

It should be noted that, in fact, the entire process of transition to this model consists of several periods, which include the stages described above. The periods are divided by the time of implementation of the declared actions and take into account the duration of each stage and period. Figure 2 shows the periods and stages of the formation of the process-project model of the sectoral management ecosystem in a generalized format.

As can be seen from the figure, the planned period for the formation and transition to a process-project model and its implementation in the ecosystem of sectoral management of oil companies in the Russian Federation can be up to 4.5 years. Such a long period is due to the scale of the stated goal and the breadth of processes and phenomena that must be taken into account for the correct functioning of the ecosystem, as well as the need to fine-tune the joint functioning of project tools and elements of process approaches.
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Fig. 2. Periods and stages of formation of the process-project model of the sectoral management ecosystem.

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