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Public-private partnership as a form of development of resource regions of Russia

L V Eder$^{1,2}$, I V Provornaya$^{1,2}$, I V Filimonova$^{1,2}$, A V Komarova$^1$ and M V Mishenin$^1$

$^1$Trofimuk Institute of Petroleum Geology and Geophysics, Siberian Branch of Russian Academy of Sciences, 3 Koptyug ave, Novosibirsk, 630090, Russia
$^2$Federal Research Center of Coal and Coal Chemistry, Siberian Branch of the Russian Academy of Sciences, 18 Sovetskiy ave, Kemerovo, 650000, Russia

E-mail: ederlv@yandex.ru

Abstract. The article shows that for Russia the innovative development of resource regions, based on the principles of smart specialization, should be accompanied by a significant amount of investment. A significant part of the Russian regions are enclaves, which is a characteristic feature of the economic and infrastructure isolation of the region from macro-regional and all-Russian economic relations. Such isolation is primarily due to the localization of mineral natural resources in remote areas with severe natural, economic and mining-geological characteristics. Such regions are unable to attract private investment to a large extent. In these circumstances, the actual task is to use the principles of public-private partnership (PPP).

1. Introduction
Public–private partnerships (PPPs) relate to a range of collaborative efforts between public and private organizations [1]. In its narrowest form, PPP refers to a particular type of contractual arrangement between public and private organizations [1-3] that is formed to fund, build, administer and sustain infrastructure (COM 2004 3271). Nevertheless, different types of public arrangements from traditional contracting to more innovative forms [4] are suggested to advantage from the characteristics of partnership relationships, for example, shared goals, reciprocity and trust. Therefore, the PPP concept is applied here to understand generally collaborative relationships between public and private organizations [5-6] and PPP is defined as an institutional arrangement between public and private organizations [7] that includes collaboration to reach shared goals of delivering public services. If properly managed, PPPs expand resource exchange, diminish transaction costs, increase risk sharing, clarify contract specifications and encourage stronger inter-organizational collaboration and thereby improve the quality and reliability of public services [8].

The paper aims to identify the possibility of using PPP practices to implement sustainable innovative development of Russia's resource regions.

To achieve this goal, the following tasks were formulated:

1. distribute the resource regions of Russia in clusters, depending on the degree of readiness for smart specialization,
2. to rank the resource regions according to the degree of readiness for smart specialization,
3. to determine the relationship between the degree of readiness of resource regions for PPP and smart specialization,
(4) to research the directions and approaches for using PPP in Russia.

2. Methods of research

Based on the comparative analysis, the relationship between the degree of readiness of Russian resource regions for the application of smart specialization and PPP was determined. The division of regions into groups was carried out by the average value.

2.1. Cluster analysis for determining resource regions prepared for smart specialization

All 27 resource regions of Russia were initially divided into prepared, partially prepared, and not prepared for smart specialization (enclave regions). The study uses a hierarchical agglomerative method of cluster analysis. Clustering was performed by ward’s method with Euclidean metric (formula 1)

$$d(X_i, X_j) = \left( \sum_{k=1}^{n} (x_{ik} - x_{jk})^2 \right)^{1/2}$$  \hspace{1cm} (1)

where $x_{ik}, x_{jk}$ – values of characteristic k for the object i and the object j.

In the work, the cluster analysis was carried out using a specialized statistical data processing package Stata 13.

2.2. Model of the ranking of resource regions by the degree of readiness for smart specialization

Simultaneously with the distribution of resource regions for clusters, these regions were ranked by the degree of readiness for smart specialization for further determination of the relationship between the degree of readiness of Russia’s resource regions for the application of smart specialization and public-private partnerships.

The ranking of regions can be carried out using 5 methods: grading, qualimetric, percentiles, interval partitioning, assignment of scores. In this work, a qualimetric method allowing to take into account the scatter of values is used:

$$K = \frac{X_i - X_{min}}{X_{max} - X_{min}}$$  \hspace{1cm} (2)

where $X_i$ is the current value for the selected indicator for the i region, $X_{min}$ is the minimum value for the selected indicator, $X_{max}$ is the maximum value for the selected indicator.

3. Results and discussion

Based on clustering methodological approaches, this study has revealed following groups: 1) economically developed resource regions of Russia, prepared for smart specialization by attracting private sector investment; 2) resource regions prepared for smart specialization using only public-private partnership, 3) enclave resource regions that initially require significant government support to enhance their investment attractiveness for private sector participation.

Because of the weak institutional framework, most enclave regions in practice are not provided enough to apply public-private partnerships. As such, the use of public-private partnerships and other forms of state support is a priority task at the initial stage, while regions with weak economic structure should receive support from the state until they become attractive for active private capital investing.

As a result of applying cluster analysis for resource-type regions in order to identify readiness for smart specialization, 10 regions were included in the first cluster, 11 for the second cluster, and 6 for the third cluster (table 1).
Taking into account the rating of the resource regions of Russia for the level of PPP development, as well as compiled rating of the resource regions, the regression relationship between these two indicators is built in terms of the level of readiness for smart specialization.

Three clusters were singled out in different colors in terms of the degree of readiness for PPPs, which was obtained by clustering at a previous stage. The first group consists of enclave regions with a low level of PPP development, the second group consists of regions that are partially ready for smart specialization and ready for the practice of PPP, the third group included regions ready for smart specialization and ready for the practice of PPP; the fourth group have a high level of PPP development, but at the same time only partially ready for smart specialization.

The second group included the Kemerovo region, which belongs to the regions ready for smart specialization, but at the same time has a low level of readiness for PPP, which is associated with poor quality of regulatory and legal acts. The Khanty-Mansiysk District, which is an enclave region, entered group IV, but at the same time it is characterized by a high level of development of the PPP sphere, which is connected with the improvement of the legislative base for ensuring access of private organizations to the provision of public services (figure 1).

The main part of PPP projects in the fuel and energy complex is carried out in regions with a long history of development of the oil and gas industry, where the transport and processing infrastructure are well developed [9-12].

In the oil and gas sector, the objects of PPP can include mineral deposits, production facilities (energy, railway transport, road facilities, ports, airports, utilities, etc.) and social infrastructure (housing, public buildings, education and health facilities, etc.) in the territories where extraction and processing of natural resources is conducted.

| Number of regions | Regions | Type of region | Description of type of regions |
|-------------------|---------|----------------|--------------------------------|
| 10                | Belgorod region, Astrakhan region, Republic Of Bashkortostan, Republic Of Tatarstan, Udmurtia, Perm Krai, Orenburg region, Samara region, Krasnoyarsk Krai, Kemerovo region | Cluster No. 1 – Regions are ready to smart specialization | Resource regions, which are characterized by high population density, good infrastructure, well-developed manufacturing sector, relatively high rate of innovation development |
|                   | Republic Of Karelia, Republic Of Komi, Arkhangelsk region, Murmansk region, Tyumen region, Republic Of Khakassia, Zabaykalsky Krai, Irkutsk region, Tomsk region, Republic Of Sakha, Amur region | Cluster No. 2 – Regions partially ready for smart specialization | Resource regions, which are characterized by low standard of living of the population, low value of innovative goods and services, low volume of investments in fixed capital |
| 6                 | Nenets AO, Khanty-Mansi AO, Yamalo-Nenets AO, Sakhalin region, Chukotka AO, Magadan region | Cluster No. 3 – Resource enclave regions (not ready) | Resource regions, which are characterized by low population density, high standard of living of the population, relatively underdeveloped transport and processing infrastructure, high value of accumulated foreign investment |
Figure 1. Dependence between the ranking of the regions of Russia depending on the level of PPP and on the level of readiness for smart specialization.

4. Conclusion

The paper shows that in the case of Russia the innovative development of resource regions based on the principles of smart specialization should be accompanied by a significant amount of investment.

The majority of the resource regions of Russia are characterized by a relatively low level of: the development of the institutional environment; legislative base for the PPP practice; experience in the implementation of PPP projects. As a result, most resource regions are not ready to apply the practice of PPP due to weak development of regulatory support, insufficient transparency and lack of investment attractiveness.

Thereby, nowadays an active task is to prepare the regions for the practice of PPP with the subsequent increase of their economic, infrastructural, innovative, personnel and qualification levels to that extent where it is possible to organize integrated exploitation with the necessary volume of private investment for sustainable development in the long-term perspective.

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