

CDSSES 2020**IV International Scientific Conference "Competitiveness and the development of socio-economic systems" dedicated to the memory of Alexander Tatarkin****METHODOLOGICAL ASPECT OF THE REGIONS RESOURCE-BASED TYPOLOGY**

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Abstract

This study aims to offer an approach to typologize of regions depending on their resource base. The study relies on analysis and synthesis methods, method of abstractions, methods of generalization and typology, and analysis of socio-economic time-series. The approach is based on a three-stage evaluation of resource-based comparative advantages of regions. We distinguish between two main types of resources: 'traditional' (human potential, natural resources, financial and productive assets) and 'innovative'. First, the regions were ranked according to their access to resources of the first type. For the second type of resources, we used the Russian Regional Innovation Development Ranking data compiled by the Higher School of Economics. We also investigated the role of resources (tangible or intangible) and identified the two corresponding types of economic sectors – those relying on tangible and intangible resources. This led us to build and compare regional economies' profiles with the prevalence of tangible or intangible resources.

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Keywords: Development resource, region, regional variation, typology



1. Introduction

Each region presents a unique constellation of socio-economic characteristics, including specific advantages, problems, challenges and threats to its development. Thus, there is no universal approach to regional management; policy-makers need to consider regions' specificities, particularly when devising strategies and tactics to address the resource gap problem. Therefore, a comprehensive and accurate resource-based typology of regions is required to facilitate policy-making. This task is particularly pertinent to Russia, a country characterized by considerable regional variations. A system of measures based on such typology will foster growth in Russian regions by helping them capitalize on their strongest or unique assets and provide them with targeted support in tackling their challenges.

2. Problem Statement

Typologization or creation of a system for dividing objects into different types according to one or several characteristics is one of the commonly used research methods: researchers may choose to classify economic entities (Martinez-Roman, 2017; Troshkina, 2016), or groups of entities (Howcroft & Bergvall-Kareborn, 2019), or relations between them (Asmar et al., 2020; Ferreira et al., 2020). Numerous studies propose different approaches to typology of territorial units, such as regions and municipalities. Such typologies are usually based on evaluation of different parameters of their development (these parameters may be quite heterogeneous). For example, Angeoletto et al. (2016) studied medium Brazilian cities and built their typology based on 127 variables - environmental (environmental impact, number of environmental events, etc) and socio-economic (demographic indicators, social welfare indicators, etc). Sluka et al. (2019) propose to use the Geographic Size Index (GSI) to rank and classify world cities. The methodology uses such parameters as territory, population and gross domestic product at purchasing power parity. Goerlich et al. (2016) propose a rural/urban typology for Spanish municipalities based on three criteria: population density, land use and the degree of accessibility from the countryside to cities. Kurbatova et al. (2019) describe a typology of regions based on a two-factor model and such criteria as the share of the extractive sector in GDP and the ratio of the extractive sector to the manufacturing sector.

Different criteria and methods of data analysis are used to create typologies of regions, such as multivariate analysis (Angeoletto et al., 2016), clustering (Bretagnolle et al., 2019; Hedlund, 2016), methods borrowed from the approaches intended for analysis of territorial units of a different scale (Russo et al., 2017). However, typology of regions does not always need to encompass all the processes in the region or a large number of indicators. To build a typology, only one criterion may be enough provided that it determines a range of distinctive characteristics with considerable effects on regional development. An example of such criterion may be the resource potential of territorial systems. Undoubtedly it is the resources of this or that region (as well as their use) that determine the socio-economic situation in this region and its further development. These resources need to be taken into account by policy-makers when setting strategic objectives and priorities for regional development (Levin et al., 2019; Noack et al., 2018).

In this paper, resources are broadly defined as assets that can be readily drawn upon when needed. Importantly, resources should enable the development (growth) of the region (or any other territorial unit) that owns them.

In economics, the concept of resource is usually linked to assets used to produce goods and services, in other words, to factors of production. Traditionally, the main sources of income (development resources) include labour, land (natural resource), and capital (previously produced assets), for example, Smith (2018) considered the source of any income rent, profit, and wages. At a later stage, one more item was added to this classical list of factors of production - entrepreneurship (as cited in Bankovky, 2018; Schumpeter, 2004). In recent studies, the category of resources has become extremely complex and includes natural resources (Fedulova et al., 2018; Krivinen et al., 2018), financial assets (Indus, 2018), human capital (Avraamova & Titov, 2018), and intangibles, whose quantitative assessment is a rather challenging task (Mikhalkina & Kosolapova, 2018).

3. Research Questions

Since the category of resources includes a diversity of objects with varying parameters and properties, evaluation of regional resource potential becomes a daunting task. It is necessary to take into consideration multiple heterogeneous factors that determine the specificities of regional assets and for further analysis integrate these data into a single criterion, which can be used to underpin a typology of regional systems.

4. Purpose of the Study

The purpose of this research is to offer an approach to building a resource-based regional typology. To achieve this aim, we need to develop a set of criteria, to devise and test an efficient algorithm.

5. Research Methods

Methodologically, this study relies on methods of regional economic analysis as well as general methods, such as analysis and synthesis, method of abstraction, methods of generalization and typology, and analysis of socio-economic time-series.

6. Findings

We propose a resource-based typology of regions resulting from the evaluation of their access to various resources. Not only does our typology take into account the availability of specific resources in this or that region but it also enables us to describe the qualitative characteristics of these resources. Importantly, this approach puts an emphasis on regions' access to resources rather than on the efficiency of their use.

The benefits of this approach include the following:

- it relies on the information that is readily available; the methodology is based on the indicators widely used in the official statistics and the open data sources;
- the methodology is quite simple as it includes the minimum number of indicators to avoid double counting for some factors;
- the necessary calculations are also quite simple.

The algorithm for building regional typologies is illustrated by Figure 1.

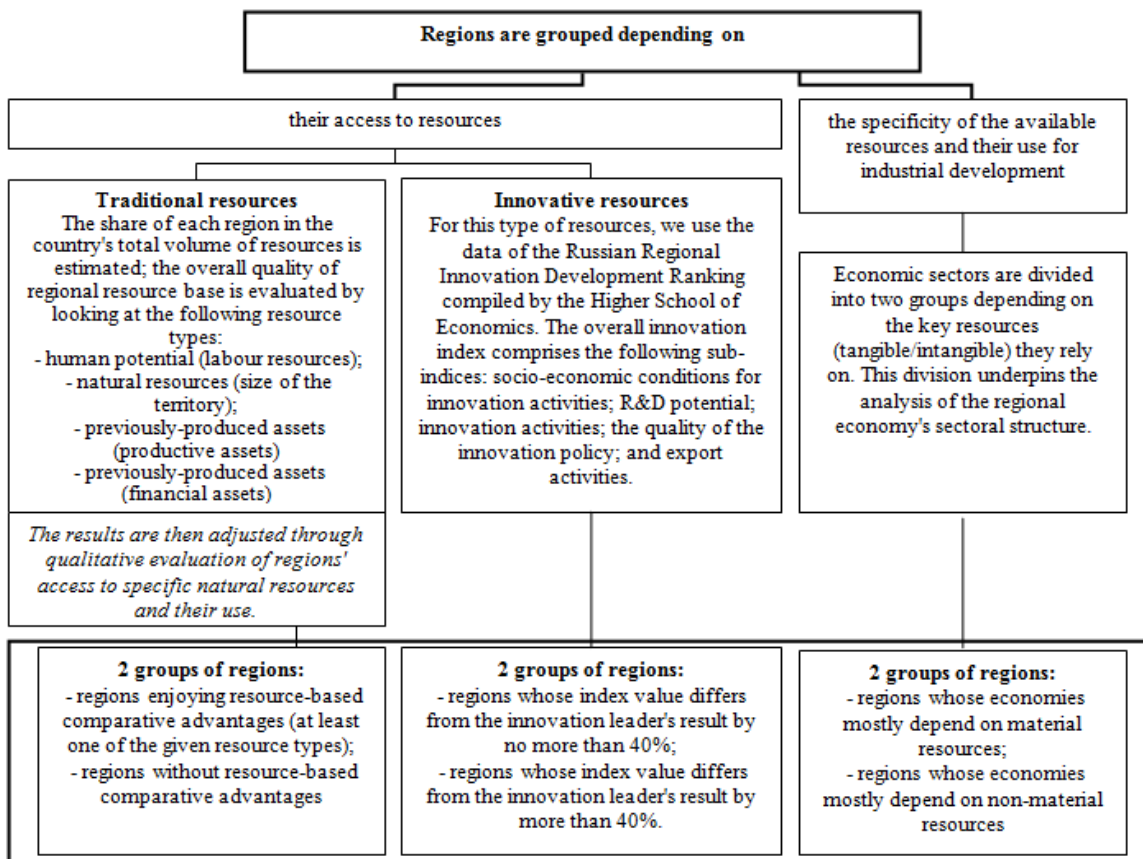


Figure 1. Algorithm of resource-based typology of regions

First of all, we need to evaluate and compare regions' access to specific types of resources. In this typology, the type of resources is less important than the very fact of a region's access to the amount of resources far exceeding the corresponding figure in other regions.

At the first stage, regions are classified depending on their access to traditional resources such as the human potential (labour), natural resources (land), and fixed capital (higher-order resources will be considered further). For resource assessment, we chose several indicators used in official statistics (Table 1).

Table 1. Indicator-based assessment of resources

Resource	Indicator	Indicator description
Human potential	Active population, ths persons	The population that is currently employed or seeking employment in the economy
Natural resources	Land area, ths sq.km	Size of the region's territory
Productive assets	Fixed assets value, mlnrbs	Total amount of tangible assets used in the process of production for a long period of time, retaining their in-kind form and transferring their value to the goods produced
Financial assets	Fixed capital investment, mlnrbs	Total costs of creating and reproducing the fixed assets

The choice of an indicator characterizing human potential is quite obvious: since people in a region are considered as a labour resource, active population is the most suitable parameter to evaluate it.

Natural resources constitute a broad category encompassing land, forests, water, and mineral resources. Their diversity cannot be captured in a single indicator, which is why to characterize the access to natural resources of different types, different, sometimes incomparable measurement units are used. Therefore, for initial evaluation of regions' access to natural resources, we propose to use the data on their land area – it is an integral indicator which can give us an idea of the region's size and to some extent (although not always accurately) help us evaluate the availability of resources tied to a certain geographic location. Obviously, for a more precise evaluation of resource availability, we will need to adjust the resulting regional ranking by taking into account the amounts of mineral resources and the size of forest area that significantly exceed similar values in other regions.

To evaluate the availability of financial and productive assets in regions, two indicators will be used: fixed assets value (shows the scale of productive assets in the region) and fixed capital investment (shows the amount of financial resources available for economic development).

What matters is not the absolute values but the shares of resources in each of the chosen territories: after the shares of all the resources were calculated (by using the selected indicators), regions can be ranked in descending order according to their share in the total volume of this or that resource in the country. Then each of the resulting rankings is divided into four parts or groups of regions: group 1 consists of the leaders in terms of resource availability while group 4 are the regions without any comparative, resource-related advantages. Regions are grouped according to the following algorithm: first, we determine the arithmetic mean of the maximum and minimum value in the given parameter (the share of resources for each region), then we select the group of regions whose results exceed the mean value (group 1). The remaining regions are again divided into two groups by using the ratio of their values in the given indicator to the arithmetic mean. Then the procedure is repeated once again for territories with the lowest values in the given parameter. Regions with higher positions (those that get into groups 1, 2 and 3 at least in one of the rankings) are the regions with comparative, resource-based

advantages (in our ranking, there are 40 such regions). Other regions do not have such advantages and there are 45 of them.

As we have pointed out above, the preliminary results require further clarification: in other words, we need to zoom in on each of the regions in group 2 and take into account those of their resources that were left unnoticed in the previous analysis (e.g. mineral deposits or forest area). If a region is far ahead of other regions in terms of mineral resources and forest area, its position within the group can be adjusted. After analyzing the official data provided by Russian regional authorities, the data from the official report 'On the State and Use of Mineral Resources in the Russian Federation in 2016 and 2017' and the data from the business-portal on the use of subsurface resources (<https://nedradv.ru/>), we decided to adjust the position of Orenburg region (which is abundant in oil, gas and copper), Belgorod and Kursk regions (the largest iron ore producing regions).

To evaluate the distribution of innovative resources across regions, we are going to use the data from the Russian Regional Innovation Development Ranking (<https://www.hse.ru/primarydata/rir>) of the Higher School of Economics (the research was conducted by the HSE's Institute for Statistical Studies and Economics of Knowledge and the Russian Cluster Observatory). In the HSE's methodology, regions' access to innovative resources is determined by the creative and innovative activities of economic entities in these regions, their R&D potential and knowledge-intensive economy. This methodology is based on the regional innovation index calculated for each of the Russian regions by taking into account a set of parameters characterizing regions' access to various 'innovative' resources - the level of innovation in the region, socio-economic conditions of innovation activity, R&D potential, innovation activities of economic entities, export activity and the quality of innovation policy. It should be noted, however, that the level of innovation-driven growth in regions does not only reflect the availability of 'innovative' resources, it also depends on regions' capability to benefit from the already existing potential and its qualitative characteristics.

The HSE's research has shown that there are two large groups of Russian regions:

- the regions with comparative advantages based on innovative resources (regions whose innovation index differs from the leader's result by no more than 40%);
- the regions without comparative advantages (regions whose innovation index differs from the leader's result by more than 40%).

In addition to comparison of regional resource potential, it is also reasonable to look at the form of these resources - tangible (physical objects with a specific geographical location) or intangible (non-physical objects without a 'fixed' geographical location) - and the role of tangible or intangible resources in the development of regional economies.

At each of the three evaluation stages, Russian regions can be divided into two groups. As a result of the above-described procedure, eight groups of territories are identified (Table 2).

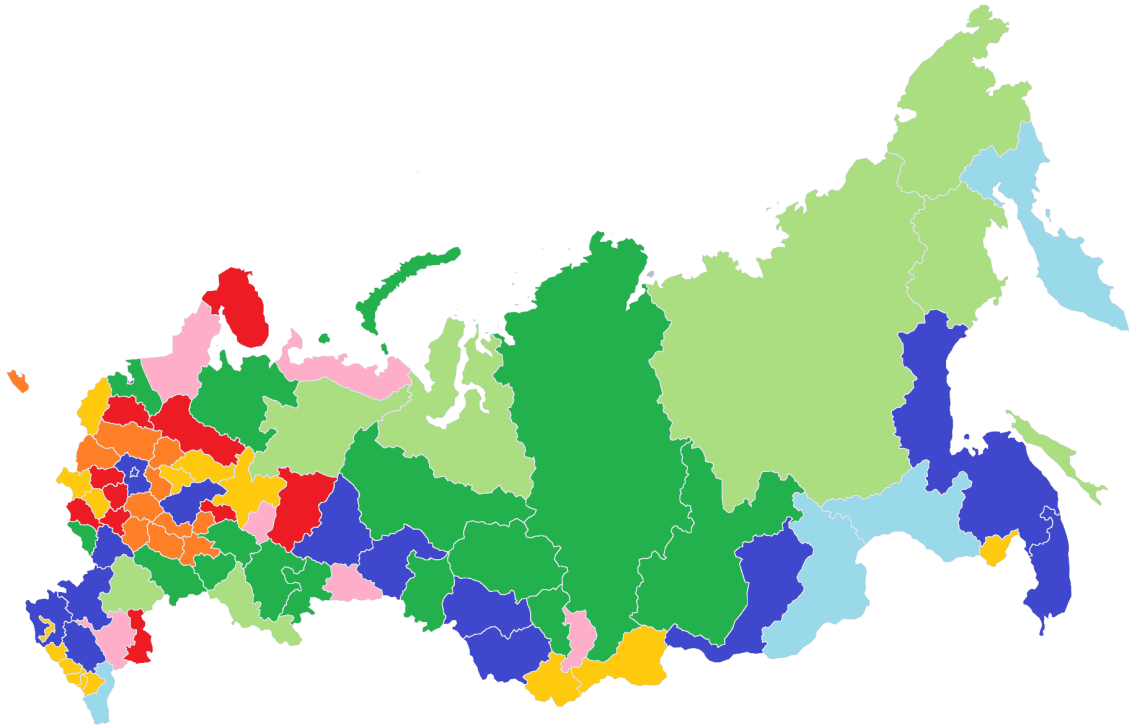
Table 2. Resource-based typology of regions

	Regions relying predominantly on intangible resources		Regions relying predominantly on tangible resources	
	Regions with comparative advantages (traditional resources)	Regions without comparative advantages (traditional resources)	Regions with comparative advantages (traditional resources)	Regions without comparative advantages (traditional resources)
Regions with comparative advantages (innovative resources)				
Regions without comparative advantages (innovative resources)				

Russian regions can be roughly divided into those that are more dependent on tangible than intangible resources and vice versa. It means that we need to look at the sector-specific characteristics of regional economic systems and estimate the contribution each sector makes to the development of the region in order to understand the role of this or that resource in regional economy. In a similar fashion, we can distinguish between the two types of economic sectors: those that rely on tangible resources (manufacturing industry, extractive industry, agriculture and so on) and intangible resources (trade, service sector, and so on). Following this, we analyze the structure of a regional economy by looking at the share of each economic sector and identifying territories that predominantly rely on tangible or intangible resources.

The regions were evenly distributed into groups, which makes all groups equally significant for further analysis. The regions without any comparative advantages deserve special attention. It should be noted that regions sharing certain resource-related features tend to be located in close proximity to each other: for example, north-eastern regions of Russia mostly depend on 'traditional' resources while central regions rely more heavily on 'innovative' resources.

The results of the divide of Russian regions into eight groups are illustrated by Figure 2.



Each of the eight region types is highlighted with a different colour corresponding to the colour-coded indication in Table 2.

Figure 2. Resource-based typology of Russian regions

7. Conclusion

The proposed algorithm for building a resource-based typology of regions comprises a three-stage evaluation of regional resource potential. This approach takes into account competitive advantages attained by the regions with access to 'traditional' resources (human potential, natural resources, productive and financial assets) and 'innovative' resources (those that enable regions to remain competitive in the digital economy). The next step is to evaluate the role that resources of two different forms - tangible and intangible - play in regional economies. The difference between these two forms of resources lies in their relation to specific geographic locations or, on the contrary, the lack thereof.

Within the three typology variants, Russian regions were divided into two groups. As a result, we identified eight groups of territories in terms of their access to resources of different types and form and the corresponding regional specializations. The proposed typology can be used by policy-makers to set the priorities and focus areas of regional development.

Acknowledgments

The paper was prepared in accordance with the grant of the President of the Russian Federation for state support of young Russian scientists MK-3442.2019.6

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