

**STRUCTURAL CHANGES  
IN THE ECONOMY  
OF THE RUSSIAN  
NORTHWEST:  
SPATIAL DIMENSION**

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*This paper identifies and explains trends in the economic transformations in the Russian Northwest (NWFd). It studies changes in the structure of the gross regional product (GRP) and economic specialization of the NWFd regions. The authors suggest approaches to managing structural changes in the economies of the NWFd regions. The authors propose a new method for the identification of the regional economic specialization based on the regional economy sectoral development rate. The article describes a methodology for identifying the development of the regional economic sectors using the gross value added index calculated per capita and per sector against the national average. The article presents the analysis of the structural changes in the NWFd gross regional product. The proposed gross value added index helps to identify the upward and downward trends in each sector compared to the national average. Based on this analysis, the authors describe the nature of changes in the NWFd sectoral specialisation, which correlated with the distance to large economic cores — Moscow and St. Petersburg. The authors prove that the economic development of the Northwest macroregion follows the core/periphery pattern. The regional economy structure depends on the position of a given region in relation to the core. Concrete approaches to managing structural changes in the economies of periphery regions are proposed.*

*Key words:* economic space transformation, core-periphery, spatial inequality, structure of gross regional product

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## **Introduction**

Numerous studies supported by vast data demonstrate that the development of a modern economic system is characterised by spatial non-uniformity [2; 8; 13] manifested in economic activities concentrating in agglomerations with periphery regions lagging

behind. This results in a certain degree of polarisation of economic space and imbalance between regional economic structures, i. e. the development of a *polar* regional specialisation in certain industries.

Different aspects of spatial non-uniformity in Russia have been discussed in numerous publications. An attempt to review relevant works was made by K. P. Glushchenko [1]. A comprehensive analysis of economic activity concentration and regional specialisation is presented in a monograph by S. N. Rastvortseva [6]. The latter suggests classifying regions based on the regional specialisation index and distinguishes between two groups – those with high and low index values. Regions with a high specialisation index are further divided into two subgroups: regions engaged in extracting industries and all the others. At the same times, subgroups specialising in the other economic sectors, for instance, manufacturing and services, do not comprise individual categories in this classification, which might complicate interregional specialisation comparisons.

An analysis of spatial concentration of economic activities in Russia, based on most relevant statistics (as of 2011 inclusive), is presented in an article by E. A. Kolomak [4]. One of the parameters considered is gross regional product (GRP), but the author does not analyse the regional GRP structure.

The Northwestern federal district (NWFD) includes one of the largest national agglomerations (Saint Petersburg), scarcely populated and remote regions, and those occupying a middle position between the two. Thus, the NWFD is a representative territory for studying the processes of economic space transformation.

The spatial non-uniformity of economic development of NWFD regions is the focus of a study by L. I. Rozanova and M. V. Moroshkina [7], where the interregional comparison is based on investment activity. There are few international studies into the economic development of NWFD regions. However, it is worth mentioning an article by J. Kortelainen and P. Ranikko [16], which considers a local economic development model in the periphery border regions of the Russian Northwest and focuses on the timber industry in two municipalities.

This work aims to identify and interpret the trends in the economic space transformation in the NWFD based on an analysis of changes in GRP structure and regional economic specialisation and developing approaches to managing structural changes in the economies of periphery regions.

## Methods

This study is based on Rosstat statistics on the GRP structure of each region. The key parameter is GRP per capita by industry. The period under consideration — 2004—2013 — was chosen based on the availability of relevant data.

The statistics on Russian regions' GRP is available for consolidated industries ('types of activities' in the terminology used by Rosstat). We grouped these activities into sectors — non-marketed services sector, marketed services sector, construction sectors, manufacturing sector, and raw materials sector (table 1).

Table 1

## Activities grouped by sectors

Activities according to Rosstat	Regional economic sectors
Section A. Agriculture, hunting, forestry	Raw materials
Section B. Fishing industry	
Section C. Mineral extraction	
Section D. Manufacturing	Manufacturing
Section F. Construction	Construction
Section G. Wholesale and retail; motor vehicle and housekeeping maintenance	Marketed services
Section H. Hotels and restaurants	
Section I. Transport and communications	
Section J. Finances	
Section K. Real estate	
Section E. Power, gas, and water generation and distribution	Non-marketed services
Section L. Public administration and national security, social security	
Section M. Education	
Section N. Healthcare and social services	
Section O. Other utilities, social, and personal services	

The Raw materials sector comprises activities focusing on extracting natural resources or utilising them. The Marketed sector includes production of services provided in open (competitive) markets. The Non-marketed sector comprises activities focused on producing services provided in markets characterised by price regulation. In our classification, Manufacturing and construction coincide with the respective activities identified by Rosstat.

The Rosstat data is presented as nominal GRP. To take into account the inflation factor and exclude the effect of macroeconomic processes, regional values of GRP per capita by industry were compared against the national average in the year under consideration:

$$I_{GVA_{ij}} = \frac{GVA_{ij} / P_j}{GVA_i / P} * 100 \%$$

where  $I_{GVA_{ij}}$  is the gross value added index of the  $i^{\text{th}}$  sector in the  $j^{\text{th}}$  region, %;  $GVA_{ij}$  is the gross added value of the  $i^{\text{th}}$  sector in the  $j^{\text{th}}$  region, roubles.;  $P_j$  stands for the population of the  $j^{\text{th}}$  region;  $GVA_i$  for the gross value added of the  $i^{\text{th}}$  sector in Russia, roubles;  $P$  for the population of Russia.

This value is calculated for each studied period (year). This makes it possible to obtain chronological series of GVA per capita values by industry expressed as a percentage of the national average. The resulting index reflects the level of development of individual sectors of the regional economy



as compared to the national average. In this work, this index will be referred to as the gross value added index.

Calculating a series of GVA index values for 2004—2013 made it possible to identify trends towards the strengthening and weakening of each regional economic sector as compared to the national trend. The analysis made it possible to track changes in the industrial specialisation of NWFD regions.

It is important to make a methodological remark about certain aspects of the NWFD economic space taxonomy. Statistics considers the city of Saint Petersburg and the Leningrad region as two separate regions. Here, we examine them as a single region due to the need to ensure comparability of the studied regions within a comparative analysis of their industry structure. Of course, treating a large highly urbanised city and a region comprising both urbanised and non-urbanised territories as equal analysis units is not entirely appropriate, yet in a broader sense treating Saint Petersburg and the Leningrad region as a single unit maintains the principle of spatial continuity.

### Results

Analysing time series of the GVA per capita values shows that they tend to increase, as compared to the national average, in the Republic of Komi, Saint Petersburg, and the Leningrad and Kaliningrad regions. A pronounced downward trend is observed in the Vologda and Murmansk regions. GRP does not exceed 80% of the national average in the Republic of Karelia and the Novgorod and Arkhangelsk regions and 50% in the Pskov region. GRP changes in these regions suggest that it is contained within that range (fig. 1). Leaders in the absolute aggregate GRP values are the Republic of Komi, Saint Petersburg, and the Leningrad region.

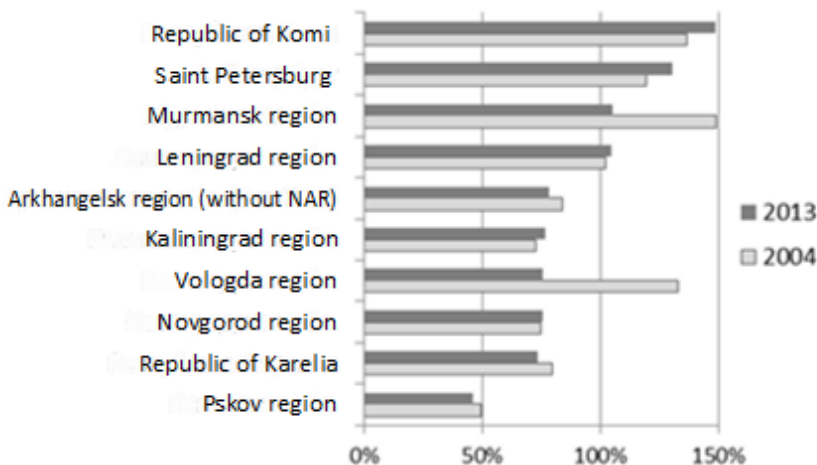


Fig. 1. GRP per capita in NWFD regions, % of the national average

Distribution of NWFD regions by the absolute value of and changes in aggregate GRP per capita follows the core/periphery logic. High GRP and upward trends are observed in the core — Saint Petersburg and the Leningrad region. Low GRP and stable or downward trends are observed in the periphery regions. At the same time, two remote NWFD regions do not follow the core/periphery pattern (when *aggregate* GRP per capita is considered). These are the Republic of Komi and the Kaliningrad region. In these regions, GRP per capita tends to increase as compared to the national average. In the Republic of Komi, its absolute value is much higher than the national average. To identify the factors affecting these phenomena, let us analyse the *structure* of and changes in GRP in NWFD regions.

The results of processing the statistics necessary for analysing the GRP structure of NWFD regions are shown in fig. 2. Based on the development of certain economic sectors in 2013, NWFD regions can be divided into the following four groups.

Group 1 comprises regions specialising in marketed services and manufacturing. In the NWFD, these are only Saint Petersburg and the Leningrad region. In these sectors, GVA per capita is 1.5 times the national average.

Group 2 consists of regions specialising in manufacturing. This sector is the only one where value added per capita is above the national average. In the NWFD, such territories are the Vologda, Novgorod, and Kaliningrad regions (fig. 2). However, the marketed services sector is weaker in these regions than that of group 1 (Saint Petersburg and the Leningrad region), and its performance is below the national average. The contribution of raw materials is insignificant — relative GVA per capita is between half and third of the national average. In the Vologda region, GVA per capita was decreasing steadily in manufacturing as compared to the national average — from 295% in 2004 to 145% in 2013. If this trend continues, the Vologda region will lose its manufacturing specialisation. In the Kaliningrad region, GVA in marketed services is approaching the national average. If this continues, the Kaliningrad region will join group 1.

Group 3 brings together regions without a clear specialisation. No economic sectors of these regions demonstrate performance above the national average, i. e. GVA per capita in all regional sectors is below the national average (probably, with the exception of non-marketed services sectors). This category includes the Republic of Karelia and the Pskov and Arkhangelsk regions (without the Nenets autonomous region) (see fig. 2). The only sector, whose GVA per capita approaches the national average is non-marketed services.

Group 4 consists of regions specialising in raw materials — the most developed sector on these territories. In the NWFD, it includes the Murmansk region, the Republic of Komi, and the Nenets autonomous region (see fig. 2). The raw materials sector is actively developing in the Republic of Komi contributing to the ‘pattern breaking’ GRP growth in this periphery region. This means that the GRP growth is accounted for by the region’s increasing raw materials specialisation.

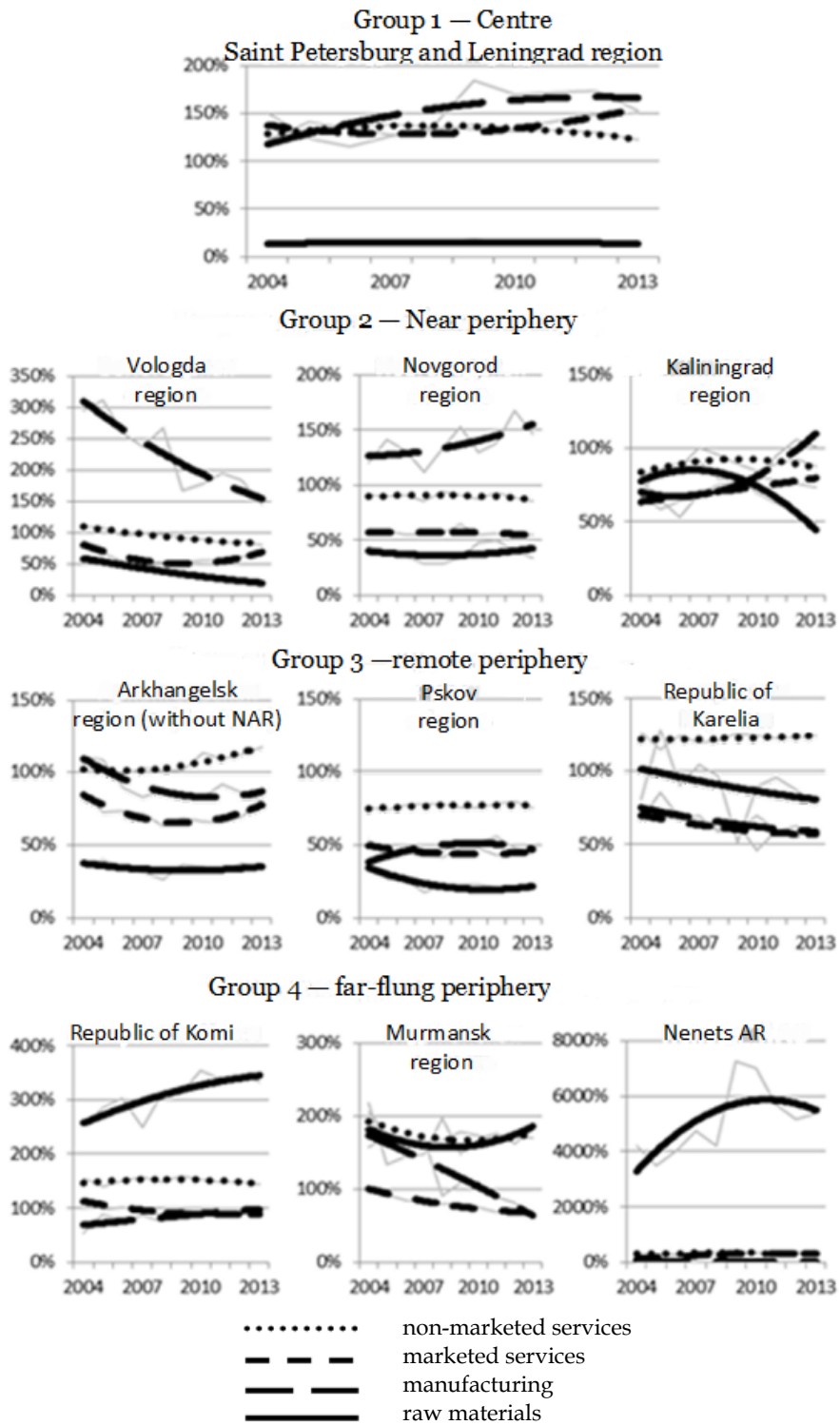


Fig. 2. Gross value added indices for NWF D regions

Analysing the specialisation of each NWF region in the context of its geographical position, one can see that region's specialisation correlates with its spatial position in relation to Russia's two economic cores — Saint Petersburg and Moscow, the closest to the NWF regions (table 2).

Table 2

**Distance to economic cores and regional specialisation, km**

Region	Distance		Total	Specialisation
	To Saint Petersburg	To Moscow		
Novgorod region	200	530	730	Manufacturing
Vologda region	520	470	990	Manufacturing
Pskov region	290	740	1,030	No clear specialisation
Republic of Karelia	420	1,000	1,420	No clear specialisation
Kaliningrad region	1,000	1,200	2,200	No clear specialisation
Arkhangelsk region	1,400	1,200	2,600	No clear specialisation
Republic of Komi	1,500	1,300	2,800	Raw materials
Murmansk region	1,300	1,900	3,200	Raw materials
Nenets autonomous region	2,600	2,500	5,100	Raw materials

Therefore, the above classification can be supplemented with the description of the geographical position for each region. The core of the NWF is Saint Petersburg and the Leningrad region — the second largest centre of Russia. Its economic structure is dominated by high value added sectors. The Novgorod and Vologda regions are classed as 'near' periphery, which describes both their geographical position and economic structure. Firstly, the Novgorod and Vologda regions are the closest to the regional core in terms of economic structure, since they have retained their manufacturing specialisation. 'Remote' periphery regions include the Arkhangelsk region, Pskov region, and the Republic of Karelia. They are geographically remote from economic cores, whereas their economic structure lacks a clear specialisation in either high-GVA or raw materials sectors. The 'far-flung' periphery includes the Murmansk region, the Republic of Komi, and the Nenets autonomous region — the most remote territories from the economic cores. They are located a significant distance from Moscow and Saint Petersburg. Their economic structure is opposite to that of the core, since they specialise in raw materials. An exclave with a special economic zone regime, the Kaliningrad region is a separate case.

To analyse the *process* of changes in the regional GRP structure in the NWF, let us compare the distribution of regions by specialisation in 2004 and 2013. In 2004, the NWF was dominated by regions specialising in manufacturing (fig. 3). However, in 2013, the Murmansk region lost its manufacturing specialisation and moved to the raw materials periphery group, whereas the Arkhangelsk region became one without a clear specialisation. Although the trends in structural economic changes continue in the

NWFD, the Kaliningrad region is becoming a territory specialising in marketed services and manufacturing. The Novgorod region will retain its manufacturing specialisation but the Vologda region is likely to lose it (fig. 3).

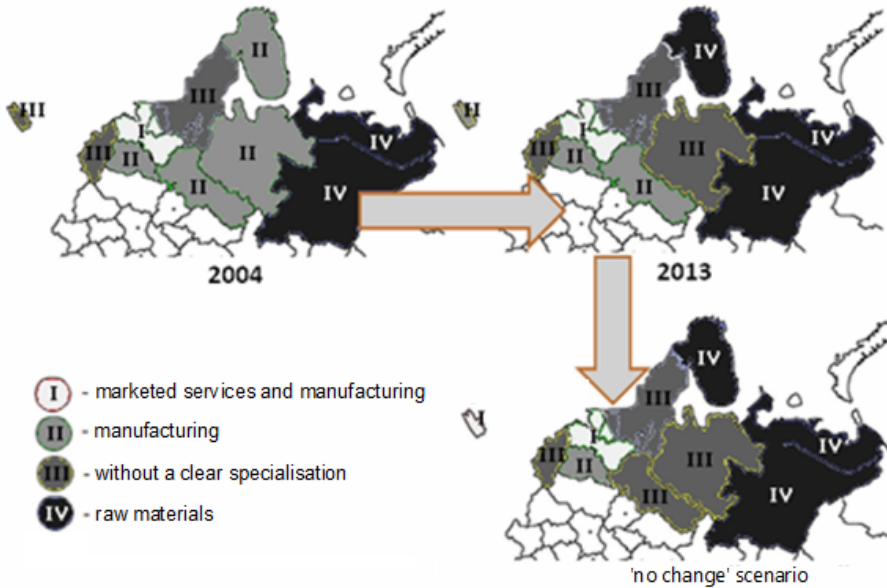


Fig. 3. Changes in NWFD regions' specialisation

The Kaliningrad region is the only exception from the general trend of high value sectors gravitating towards the core. This phenomenon can be explained by the region's advantageous position as compared to the other NWFD regions, the functioning of the special economic zone regime on its territory, its border position [3] and involvement in transboundary value chains.

Mapped visualisation simplifies the perception of information (fig. 3) but does not necessarily reflect data accuracy. Thus, it is important to describe the non-uniformity of economic structure in the NWFD in quantitative terms. For this, let us identify the difference in the development of different economic sectors between groups of regions occupying opposite positions along the core/periphery scale — Saint Petersburg and the Leningrad region, on the one hand, and the 'far-flung' periphery, on the other. Let us assume that the difference is expressed in the correlation between the GVA indices for marketed services, manufacturing, and raw materials. The results of the calculations are shown in figure 4.

When analysing changes in the difference in the development of marketed services and manufacturing sectors, one can see that, in the beginning of the studied period, there was a trend towards the convergence between the core and the periphery. The gross value added index of the periphery regions was only 20% below that of the core. However, in 2006—2007, the situation changed and the difference between the core and periphery regions started to grow, becoming 1.8—1.9-fold in 2013 (fig. 4).



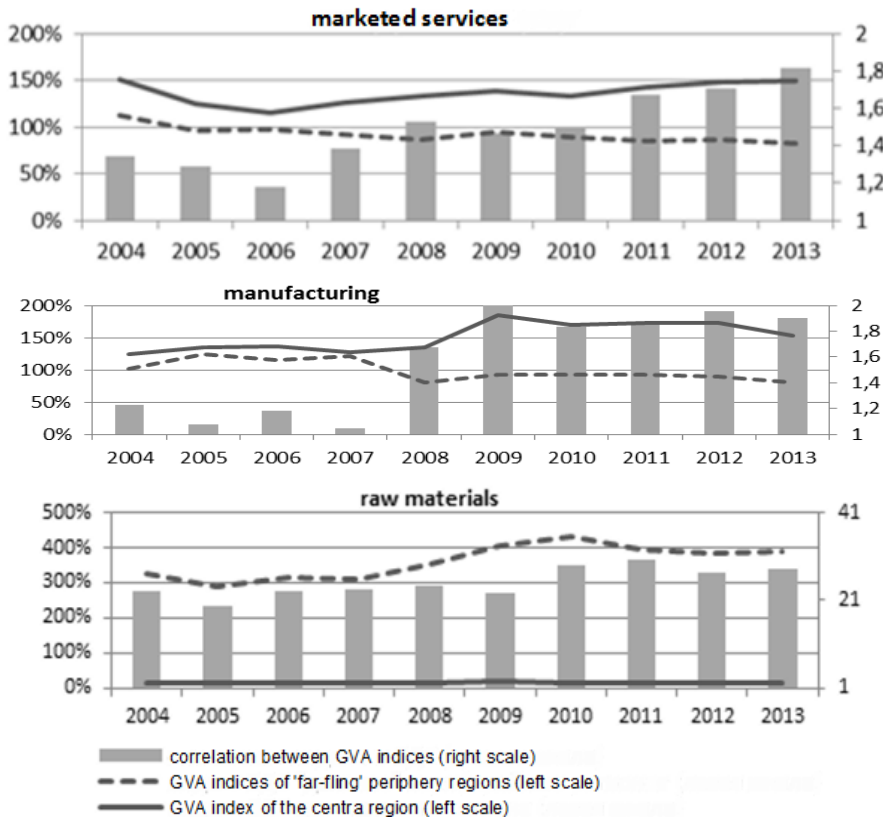


Fig. 4. GVA indices of the core and periphery regions of the NWFD

Raw materials are becoming increasingly dominant in the 'far-flung' periphery of the NWFD, which is proven by the relevant GVA index growth from 325% in 2004 to 392% in 2013 (fig. 4). In the core region of the NWFD, the index value is rather stable, ranging from 13 to 18%. Development of the raw materials sector is accompanied by the divergence of the core and periphery. However, this time, the core is lagging behind.

Our analysis shows that concentration of high value added sectors in the macroregion core and raw materials specialisation of remote regions tend to increase.

Therefore, transformations of the economic space of the NWFD follow the core/periphery pattern, which manifests in the polarisation of the economic structure of the core and periphery regions.

### Conclusions and recommendations

This study made it possible to identify trends in structural changes in NWFD regional economies. An analysis of structural changes in the context of the geographical and economic geographical position of regions demonstrated the direction of processes associated with the economic space transformation.

Not unlike other peripheries, Russia's northwestern periphery (especially along the outer borders) undergoes global transformation [5]. Although they cannot compete with agglomerations in terms of added value, investment, and household spending, periphery regions play an important role in cultivation and 'retention' of territories. Russia's Northwest has strong economic ties with European countries and thus contributes to achieving an important geopolitical objective — promoting and implementing competitive projects for territory development — in the conditions of systemic challenges and strong competition from the relevant projects of neighbouring countries.

Polarisation of the economic space accompanied by excessive centralisation of power increases differences between the developed core and the weakened periphery. This results in a number of typical issues: depopulation, weak economic activity, budget deficit, low investment potential, poverty and social differentiation, insufficient urbanisation, and the obsolescence and insufficiency of infrastructure. Polarised development leads to a decrease in the quality of labour force, out-migration, reduction in economic activity, and finally, transition from periphery to downward transition regions. This results in Russian regional policy focusing on the issues of socioeconomic and spatial development of periphery regions.

A deficiency in the traditional approach is underestimation of systemic risks and inability to identify key competences that can be translated into fundamental benefits through organised economic activities and development of new tools that would take into account economic cycles and external global challenges faced by periphery regions [10]. This manifests in the absence of innovative hi-tech industries, which would give rise to new markets of hi-tech products and services and rapid dissemination of technology in traditional and new industries.

European research focusing on the development of periphery territories identifies innovation as the key element of a region's economic development. For instance, D. Doloreux [12], K. Onsager [18], A. Isaksen and J. Karlsen [14], D. Baumgartner [11], and S. Virkkala [20] stress the low density of economically active population, weak interregional competition, small local market, and a narrow knowledge base. F. Tödtling and M. Trippl also emphasise a 'thin' regional innovation system.

We believe that economic modernisation of a periphery region is stalled by systemic limitations — low liquidity, insufficient investment attractiveness, and institutional particularities resulting in uneven distribution of investment (its concentration in agglomerations). To ensure liquidity, it is necessary to reproduce certain nodes of the economic space, including transport and engineering infrastructure, social infrastructure, healthcare, and education.

To take advantage of external effects and externalities, it is necessary to focus on managing concentration and yielding economic benefits from the effect of scale and specialisation. At the same time, periphery conditions require selective usage of the territory and practical involvement of the periphery in global processes. Thus, a regional policy should focus on functional and innovation zones and other supra-regional industrial units rather than traditional regions.

Based on the results obtained, we offer recommendations for the development of a regional economic policy that, on the one hand, would not stall the objective processes of economic space polarisation and, on the other, would stimulate the development of economic activities in periphery regions based on their unique advantages and human capital.

A strategic analysis makes it possible to formulate three approaches to the structural modernisation of a periphery region's economy. The first one suggests selecting a strategy for strengthening a region's position in relevant markets based on increasing its specialisation and focusing efforts on selected economic sectors and technologies accompanied by an increase in production efficiency in view of inclusion into value chains and attraction of foreign investment. A specialisation is selected for cooperation and inclusion into interregional and international production chains and financial flows. This suggests a focus on the investment process, its organisational and institutional support with an emphasis on value added by resident agents within production chain, specialisation, and cooperation. As V.I. Chasovsky stresses, 'it is also possible to encourage miniaturisation of activities, since a small hi-tech enterprise can be integrated into regions of different ranks' [9, p. 166].

The second approach suggests its structural diversification based on the development of technology and industrial, transport, and logistics infrastructure and inclusion into global value chains. The expected result is creating a foundation for innovation diffusion, adoption of innovative management tools, economic diversification, increasing investment attractiveness, and finally securing innovation and technology development. Special attention is paid to developing measures to take advantage of external development opportunities (external investment and externalities).

The choice between specialisation and diversification as conceptual approaches to regional economic development has been studied by many authors. However, there is no definite answer as to whether any of these approaches is superior to the other. At the same time, T. Kemeny and M. Storpe [15] stress that strengthening a region's specialisation has a positive correlation with the level of salaries. Some even believe that specialisation and diversification are interrelated processes [17].

The third approach has not been formulated clearly. However, its elements can be used within the first and second approaches, namely, the creation of functional zone, new technologies, and technology platforms substituting traditional elements of value chains in the conditions of local community consolidation. This imperative — the creation of an innovative economy, — necessitates joining the efforts of business, science, and the states. Priorities, strategic research programmes, and roadmaps for introducing innovation infrastructure (technology platforms, industrial parks, etc.) are devised based on the above consideration and a long-term forecast for science, technology, and breakthrough area development.

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