Regional Reproduction and Formation of Territorial Sub-Systems

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Abstract: The study considers the approaches to the regional development, the method of formation of the regional production base. The economic phenomena of the territorial organization of production from the perspective of the reproductive approach are investigated.

Key words: Territorial production complex, economic area, region, social-economic development, efficiency

INTRODUCTION

The most important trend of improvement of the modern economy is the issue of organization and management of production on the basis of the rational combination of the branch and territorial differentiation of labor, the dynamism of the market economy, deep differentiation thereof. The active involvement of the new natural resources against the rather complex interactions between the market players bring to the forefront the issue of the spatial arrangement of production.

The analysis of the territorial arrangement production as a branch of economics includes the following most important trends of the regional economic surveys (Asheim and Isaksen, 2002; Camagni, 2002):

- Maintenance of the territorial economic proportions
- Formation of the regional, territorial and cross-industry networks, integrated large-scale regional programs
- Solving specific social-economic tasks within the territorial sub-systems
- Gain in performance of the territorial complexes and management thereof
- Improvement of the territorial strategic planning on the scientific basis (Bandman, 1971)

In the economic literature, there is a widespread opinion that the Western theories will save the Russian economy which completely neglects the scientific developments of the Soviet period. However, the developments of the national researchers of the beginning and the middle of the 20th century in many ways anticipate and surpass the researchers of the Foreign economists. This also refers to the theory of the cluster approach developed by Porter (2005).

However, already in the beginning of the 20th century the fundamentals of the theory of economic zoning in our country were laid by the famous Russian economist (Kolosovsky, 1969). He has created the new course 'Economic zoning in the USSR'. He was the first who made an assumption concerning the necessity of investigation of the economic zoning issues by the economic science.

The issue of the comprehensive analysis of the regional economy by different sciences was proposed by Nekrasov (1974) who focused the researchers on the comprehensive analysis of the regional economy using such methodological basis as the economic theory (Granberg, 2006).

The analysis of the regional economy within the context of the economic science is performed from the three primary perspectives. Firstly, the development of the theory of regional economy and policy including the analysis of the issues of regional differentiation, national income, rent relationships, regional social processes, formation of the new territorial economic proportions, etc.; secondly, the general analysis of the set of economic and social factors and phenomena determined by the rational formation and development of productive forces and the social-economic processes in each region and in the economy in whole; thirdly, analysis of the issues of further gain in the public production performance from the perspective of formation of complex territorial systems, maximal integrity of the economy and further improvement of the territorial differentiation of labor (Bandman *et al.*, 1984).

MATERIALS AND METHODS

Main part: In our opinion for the comprehensive analysis of the reproductive processes at the regional level the target program approach to the regional differentiation of the indices of development of the regional complex shall be used. The fundamental methodological approach to the solution of this task was designed by the researchers.

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The following task was set: to find the values of the X_{pj} variables under conditions of maximization of the aggregate economic effect, i.e., the difference of the reduced costs per a consuming structural unit from the integrated and traditional materials multiplied by the scope of integration:

$$Q = \max \sum_{p} \sum_{j} (r_{pj} - c_{pj}) x_{pj} \qquad (1)$$

At that the following restrictions are taken into account:

$$X_{pj} \geq 0 \qquad (2)$$

$$X_{pj} \leq b_{pj} \qquad (3)$$

$$\sum_{p} \sum_{j} x_{pj} k_{mj}^{h} = \Pi_{mt} \qquad (4)$$

Where:
j = The number of the kind of the industrial structure or aggregated structural group
p = Number of the consuming region
c_{pj} = Total costs per the consumer structural unit
jth = Kind of the allocated resource in conditions of the pth region
r_{pj} = Total costs per the consumer structural unit of the jth kind from the replaceable traditional materials in conditions of the pth area
b_{pj} = Ultimate demand for structures of the jth kind (from new materials) in the pth area in the consumer units
Π_{mt} = Total quantity of the allocated material in the tth year in the corresponding units
k_{mj}^{h} = Consumption of the mth resource per a consumer unit of structures of the jth kind of the new types of structures (designs)
X_{pj} = Volume of structures of the jth kind from new materials in the consumer units used in the pth area

The condition (Eq. 2) expresses the requirement of the task unidirectionality; the condition (Eq. 3) shows that the volume of the integrated structures of the jth kind cannot exceed the ultimate aggregate demand for structures from new materials in the pth area; the expression (Eq. 4) fixes the limit of the total scope of application of the new material by all kinds of structures and all areas.

The most rational method of solving the task formulated in the form of the ratio (Eq. 1-4) is ranking of

the consuming areas (regions of the country) depending on the level of economic efficiency of application of the advanced resources instead of the traditional ones. The regional index of the comparative economic efficiency of application of the new advanced industrial structures, details and materials (I_{pm}) is determined by the expression:

$$\tilde{I}_{pm} = \frac{\Im_{pm}}{\Im_{\delta m}} \qquad (5)$$

Where:
$\Im_{pm}$ = The specific value of the annual (integral) economic benefit from the use of the mth resource in the pth area instead of the reference (traditional) resource
$\Im_{\delta m}$ = The specific value of the annual (integral) economic benefit from the use of the mth resource in the basic region instead of the reference (traditional) resource

RESULTS AND DISCUSSION

After determination of the value of the $\tilde{I}_{pm}$ index by all regions they are ranked in the order corresponding to the decreasing value of this index. By performing intermediate calculations from the total scope of application of the new advanced resource Π_{mt} that is possible in the year the demand of those regions where application of the new resource features the maximum economic benefit potential is successively extracted. This procedure is repeated until the entire possible scope of application of the new mth resource in the tth (Π_{mt}) is exhausted. As the result of the calculation performed for each region the estimated scope of application of the new resource Π_{pmt} is determined and there is formed the optimized structure of those resources the total scope of application of which across the country in the tth year is limited.

Calculation of the estimate demand of each region for with account for traditional resources is performed with account for the equivalent substitution through the new resource according to the formula:

$$P_{pkt} = \sum_{i=1}^{i-n} r_{ki} \times O_{pit} - \sum_{k=1}^{k=1} K_{mk} d_{mpk} \Delta \Pi_{pmt} \qquad (6)$$

Where:
P_{pkt} = The estimated demand of the pth region for the kth traditional material resource in the tth year
r_{ki} = Specific indices of consumption of the kth material resource by design of objects of the ith branch of economy established in the reference year in the pth region
O_{pit} = The planned scope of the construction-assembly works in the tth branch of the national economy in the tth year

K_{mk} = The substitution (elasticity) ratio characterizing the ratio between the specific expenditures of the kth traditional resource and the mth new advanced kind of resource

d_{mpk} = The share of application of the mth resource in the pth region meant for substitution of the kth traditional resource

$\Delta\Pi_{pmt}$ = Additional (as compared to the reference year) scope of application of the new mth resource in the pth region in the tth year

CONCLUSION

The absolute results of calculations of the optimum regional differentiation of the branch indicators of development of the production base depend on the scope and structure of works taken for the reference ones, therefore, they constitute the value requiring periodic adjustment during the process of design and refinement of the strategic plans. Along with that the relative indices, first of all, the indicators of the rate of growth of application for some or other kinds of material resources in different districts of the country seem to be a more stable value maintaining its meaning of a quantitative characteristic of the main trends of development of the production base in a region.

In this regard, it appears to be reasonable to develop the consolidated regional medium-term target programs for the strategic support of the set of measures aimed at increasing the engineering-economic level of production. The consolidated regional target programs shall be formed on the basis of territorial differentiation of the industry-specific target programs. The summary indicators of the industry-specific target programs shall characterize the integral effect of the entire set of the industry-specific target programs on the technical and economic performance of the production base companies and enterprises on this territory over time during the entire period of the program implementation (Porter, 2003).

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