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ON THE ASSESSMENT OF CROSS-BORDER REGIONS' DEVELOPMENT POTENTIAL

This article sets out to assess the potential of cross-border region development on the basis of theoretical and methodological materials. The study examines the Kaliningrad region and Warmian-Masurian Voivodeship. The article is focused on the modelling of interindustry balance and export/import functions of border territories.

Key words: cross-border cooperation, exclave region, Warmian-Masurian Voivodeship, potential, modeling and forecasting of cross-border processes.

A study into the development capacity of a region has two aspects. The first is related to subsurface geological structure, geographical topography, climate and territories adjacent to the region. The second trend relates to the anthropogenic influence in the area. Here, first of all the level of development of settlements and cities, as well as agricultural production are taken into account. It is only natural that the issues of assessing the capacity of any territory presuppose interdisciplinary approach, including economic aspects.

Economic papers examine the potential of the region through such indicators as: the availability and accessibility of mineral resources, good natural conditions suitable for locating industrial enterprises, availability of natural transportation routes (rivers, lakes, bays, inlets) which can facilitate business contacts with adjacent territories.

The research of those economists who studied the human activities in particular territories achieved the greatest success. So for the first time in the middle of last century, a new field of science dealing with regions — regional economy — emerged. Regional economy is one of those subjects which study the region as a holistic socio-economic system. Its subject is space, regions, locations, and their changes. The term "regional science" was first introduced by the American economist W. Isard. In his paper "Location and Space Economy," he argues that the representational system of regions can be considered as an area corresponding to a certain pattern and structure.

Within this system there is a definite economic classification of cities and regions, covering various towns and areas that meet some defined the definition class. Moreover, each class corresponds to a number of functions performed by any settlement of this class, and is typical in the population size.

W. Isard writes, "Since there exists a regular, statistically proven hierarchy of cities, there must be the same hierarchy of commodity flows, based on their grouping according to the path of medium-range and volume of freight transport and the city will differ from each other in the internal structure of economy depending on the number of the class to which they belong" [1, p. 193].

W. Isard makes the main conclusion: each ordinal number of a city will match various combinations of exporting industries. He also drew attention to the fact that these industries will consume the products of other industries

and create various added values and incomes. In other words, these industries will have different "double" multipliers. W. Isard calls them Keynesian multipliers. He realizes that at some particular time a city or a district takes a definite place in the framework of a dynamical system, its spatial structure is constantly changing. So W. Isard suggested that a multiplier of an economic base is steadily changing. In other words, strengthening areas in the hierarchy, according to W. Isard, means a change in the economic base and correlation between basic and service industries in the studied areas.

In addition, W. Isard developed a regional business cycle and an analysis-multiplier, which is of fundamental importance to the development of adjacent areas, and to contemporary interpretations of trans-boundary regions. It is at the junction of the territories where the multiplier has the greatest effect.

In this regard, W. Izard studied the industrial structure, and what regional cycles are most effective in developing this structure. This was the ground to determine the area of multiplier with the emphasis on the potential and economic base of the object. However, the most important studies of W. Isard were devoted to the multipliers of interregional trade. On this occasion he wrote: "Transfer of the impulses generated by a territorial unit of any structure to other regions, shows that the impulses are always transferred through import, export, investment, consumption and income" [1, p. 173].

It should be noted that the study of regional economic cycles and the impact of a multiplier on the development of neighboring regions (the multiplier of the interregional trade) enabled W. Isard to get the most important results in his research activity. He first assessed and developed a methodology of interaction between regions and national cycles. This doctrine is still of great scientific importance.

W. Isard was also able to derive indices of localization. He devoted significant time to studies that illustrate the localization index as a measure of "balance" of the various branches of the regional economy. To do this, he carried out a detailed analysis of the flow of goods in interregional relations, enhanced the methodology of money and on this basis, developed a method of compiling and analyzing the region's balance of payments.

Active development of regional science, especially in the second half of XX century made it possible to create a number of scientific schools and trends, which were brought about by the increasing role of scientific and technological progress, the emergence of fundamentally new technologies and productions. The most important theory, which gave new impetus to regional research and allowed to formulate an entirely new methodology, was the theory of poles and growth centers. At that time it was this theory which allowed to conduct comprehensive studies of regional economic space, as well as allocative efficiency in this area of settlements, cities, and all branches of production.

Under present conditions big cities greatly influence the development of territories. These cities, the poles of growth, concentrate more than half of the economic potential of the studied territories. For example, Kaliningrad hosts more than 70 % of the economic potential of the region (see Fig.).

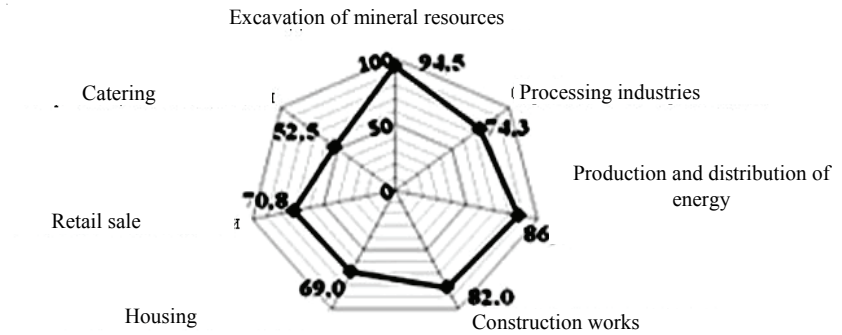

Fig. The share of Kaliningrad in the regional economy, 2010,%

Sources: [4, p. 6].

As it can be seen in the figure, there are several industries where Kaliningrad's share is the largest one. The largest is the excavation of mineral resources; its share is 94.5%. In 2010, the extracted minerals amounted to 12,040,400,000 rubles. In addition, fossil fuels accounted for 11,845,700,000 rubles. They are followed by power generation and distribution with a significant share of 86.8%. Then comes the volume of construction works — 82, 0%. The lowest figures are for the turnover of catering and housing supply (52.5 and 69.0% respectively).

A somewhat different situation in the neighboring countries. Warmia-Mazury voevodship has territorial division into three sub-regions: Olsztyn, Elblag and Elksk. In contrast to the Kaliningrad region, the areas of Warmia and Mazury voivodship cities do not play a significant role, as Kaliningrad does, so, except the city of Olsztyn; there are two other major centers — Elblag and Elk. Their shares in the economy of voevodship are almost equal, there is little predominance, as in exclave Kaliningrad region (see table).

This suggests that on the whole territory of the voedship there are favorable conditions for the economic activity. In addition to these three centers Warmia-Mazury voivodship relies on play an important role of urban centers of poviats (districts), especially such as Iława, Ostróda, Gizycko, Ketrzyn, Szczytno, Bartoszyce etc.

The Share of Olsztyn and Elblag in the economic development of the voevodship, 2010,%

Indicator	City district	
	Olsztyn	Elblag
New houses	13,9	8,1
Housing stock	14,7	9,4
Gross value of major assets	34,8	12,4
Economic entities	18,5	10,8
Investments	23,0	6,2
Budget revenue	29,2	20,3
Budget expenditure	31,1	19,3

Source: [3].

As the table shows, Olsztyn dominates on such indicators as the gross value of fixed assets and investment (34.8 and 23.0% respectively), while these indicators for Elblag are respectively 12.4 and 6.2%. The less value is seen in the housing stock and new houses: respectively 13.9 and 14.7% in Olsztyn and 8.1 and 9.4% in Elblag.

In addition, Warmia and Mazury voevodship is the territory of SEZ, which provides investors with tax incentives for local areas, and these benefits are quite substantial. For example, the rate for small businesses is 70%, for the medium-sized ones it is 60%, and for the large businesses it is 50%.

It should be noted that the methodology of the research of development capacity of border territories has a great value. There are a lot of trends and approaches there. Without listing them all, let us consider the most simple and at the same time the most effective method of simulating the potential of a particular region.

Since we are interested in the border regions, it is taken as a basis for the static input-output model (SSP), which allows the predictive macroeconomic assessment and reproductive calculations in dynamics, and most importantly it provides an opportunity to link the forecast production with investments in border the regions. It is expressed in the equation:

$$\sum_{j=1}^{n} a_{ij} x_j + Y_i = X_i, \ (i = \overline{1,n}),$$

where a_{ij} — coefficients of direct expenditures (industry average rate of production standards for industry i, used as a means to produce an item of sector i); x_j — volume of production of j- consumer branch $(j = \overline{1,n})$; X_i — gross production value (services) of i-producer-branch $(i = \overline{1,n})$; Y_i — volume of final product of i- producer-branch.

Expression $\sum_{j=1}^{n} a_{ij} x_j$ characterizes inter-industry flows, and in general an inter-mediate product; $\sum_{j=1}^{n} Y_i$ — the final product; $\sum_{j=1}^{n} X_i$ — gross national product.

A simplified dynamic model:

$$X_i^t = \sum_{j=1}^{n} a_{ij}^t x_j^t + Y_i^t + \sum I_{ij}^t, \ (i = \overline{1,n}),$$

where t — the index of the year; I_{ij}^t — the production of the branch i, used as production investments in the year t for expanding the business into the branch j; Y_i^t — the output of the final product of the i branch in the year t except for the production earmarked for expanding the business [2].

These models allow us to predict macroeconomic indicators of the border regions, to establish inter-industry links and flows of supply, structure the economy, carry out calculations of sectoral costs, price dynamics and asset intensity of industries of border territories.

At the same time, forecasting external links is used to assess the development capacity of border regions. These links and their efficiency will be determined due to the export and import function with the application of multi-factor models.

Export and import functions, i.e., multi-factor models, describe the relationship between the dynamics of exports (imports) and the indicators of the production output of the country, global trade and world prices. In economic papers, the function of exports (imports) can be represented as a function of many variables:

$$y = f(x_1, x_2, x_3, \ldots, x_n),$$

where y — the volume of exports (imports) of goods; $x_1, x_2, x_3, \ldots, x_n$ — factors (independent variables) that determine the volume of exports (imports), that is, the value of the function.

Practical patterns of models of exports (imports) are not only mathematical functions that are used in forecasting exports (imports), but, most importantly, enable to estimate the dynamics of foreign trade in all commodity groups, including those for separate commodities.

Until now, science uses the model proposed by a Dutch economist J. Tinbergen, which allows to determine the potential value of turnover in several countries. Tinbergen's model is built on three factors: the gross domestic product (GDP) in the exporting and importing countries, as well as the distance between the two countries [5]. This model consists of one equation, and it can be represented as follows

$$E_{ij} = a_0 \cdot Y_i^{a_1} \cdot Y_i^{a_2} \cdot S_{ij}^{a_3},$$

where E_{ij} — aggregate exports from i-country to j-country; Y_i — GDP of i-country; Y_j — GDP of j-country; S_{ij} — distance between the countries i and j; a_0 — a constant; a_1 — elasticity of the exports according to the GDP of the exporting country; a_2 — the elasticity of exports according to the GDP of the importing country; a_3 — the elasticity of exports in relation to the distance between the two countries [2]. The presented methodology allows carrying out specific calculations for capacity development of border regions, as well as the integration processes at the level of the balance between export (import) and the international foreign trade.

Thus, the research of the potential of adjacent regions is a multifaceted and complex task. In order to successfully solve it, the methodology should be verified, updated, the exchange of information must be enhanced and it will encourage further development of the research.

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