

# Methodological Approach to Determining the Integration Potential of the Region

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**Abstract**—The problem of uniform spatial development of territories, which requires an urgent solution in the context of the ongoing sanctions policy, limited access to international capital markets, and a decrease in growth rates in all spheres of the economy, is highlighted in the list of national tasks. The authors of the article propose a methodological approach to assessing the region's ability to interregional interaction based on the concept of the value chain (VC) of the product of the basic industries of the region. The basic concept of the VC is aimed at finding the competitive advantages of a certain company and assessing the effectiveness of its activities. This means that the object of the research is a certain economic entity. In the concept of interregional interaction, according to the authors, a research unit should be a group of organizations that are separate elements of the value chain. The study was carried out on the materials of the regions that are part of the South Siberian macroregion. The proposed methodological approach involves the study of the features of the regional economy in order to answer the question: how, in conditions of limited production factors and economic benefits, to find an algorithm for solving the problem of full and efficient use of society's resources?

**Keywords**—*interregional interaction, value chain, region, base industry, integration.*

## I. INTRODUCTION

The modernization of the world economy, as a result of the ongoing political and information processes, changes the socio-economic development of society and the technological order. Regions, acting as systemic entities, striving, on the one hand, to self-development, on the other, being part of the spatial structure of the country, remain the basic elements of the territorial structure of the national economy. The interaction of territorial entities should contribute to the strengthening of the "health of a single organism", which is the national economy, for this reason the issues of its safety in the context of international competition are of paramount importance.

Regional integration in the global sense is the integration of the economies of individual territorial entities, however,

this process should be considered through the prism of interactions between economic entities - representatives of certain regions. In studies of this area of knowledge, three types of enterprise integration are identified as components of the regional economy: horizontal, vertical, diagonal.

### Enterprise Integration

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### Integration types

The type of integration process determines, first of all, the purpose of organizing such interaction of various business entities - participants. The increase in the sphere of influence, market share, and, as a consequence, the expansion of production is characteristic of the horizontal type of integration, when there is a merger of companies producing the same type of products, works or services.

Combining enterprises of different spheres of activity, but of the same importance in the process of creating and selling products, works and services, refers to the vertical type of integration.

Representatives of the diagonal type of integration should be called consortia that bring together the efforts of organizations in different areas of activity.

The concept of "integration" in this case can be considered in two aspects at once: "in the aspect of dynamics - as a process leading to the state of connectedness of separate parts or elements of the system and in the aspect of statics as a state of connectedness, which is the result of this process" [1., p .80]

### The concept of VC in interregional cooperation

The result of the interaction process ends with the creation of a certain value that has a value. In the context of economic integration, participants in this process can be economic

entities of different territorial entities. It is inappropriate to recall the value chain (VC) of Michael Porter and consider this concept at the interregional level with certain amendments to the conditions and purpose of interregional interaction of economic entities. Potential opportunities for the outstripping growth of the firm's economy relative to its partners and business rivals are outlined in Porter's work "Competitive Advantage" [2]. It should be noted that this work is a continuation of the development of the concept of value chains formulated at the end of the seventies of the twentieth century [3]. An attempt to answer the question of what added value is and its interpretation are also contained in the works of the classics of economic science A. Smith, D. Riccardo, K. Marx, in which it is sufficiently substantiated, a statement is made about the primary basic element of the value creation process - the hired labor of workers [4]. According to Zh.B. Seiya income depends on production assets and natural factors affecting the process of reproduction of goods [5]. In the theory of JB Clarke, labor, capital and land are among the factors directly involved in the creation of value, and their influence is measured by the value of the marginal product [6]. The usefulness of the product and the intensity of its consumption formed the basis of the marginalist theory, the outstanding representatives of which are K. Menger, G. Gossen, A. Marshall [7].

VC is considered one of the modern paradigms of economic development. The practical use of the mechanism has been going on for a long period, and the scientific substantiation of its creation to enhance the effect of activities, both of an individual economic entity and the totality of efforts of a group of organizations, begins in the seventies of the twentieth century.

This is influenced by global changes in the balance of power in international capital markets and the desire of economic entities to use their own geographical advantage over partners and competitors.

Let us recall that national economic security is the sum total of the "healthy economies" of the constituent entities of the federal state. Differences in the level of economic development of individual territorial entities and the socio-economic development of society in these regions have determined the need to level it through the expansion of interregional integration. The basic concept of the VC is aimed at finding the competitive advantages of a certain company and assessing the effectiveness of its activities. This means that the object of the research is a certain economic entity. In the concept of interregional interaction, the unit of research should be a group of organizations that are separate elements of the value chain. The value creation system according to M. Porter describes the emerging relationships and activities in the process of creating a certain good.

Cooperation of the subjects of individual territorial entities, one way or another, is present in the economic space, which means that interregional interaction takes place. The question is how to measure its level and evaluate its effectiveness? Are the formed interregional ties sufficient for strategic planning of the development of territorial entities or are individual regions, being self-sufficient economic units,

evading cooperation in pursuit of the goal of individual economic growth and rivalry?

The concept of VC is aimed at competitive advantage. However, interregional cooperation, on the contrary, is aimed at leveling differences in the level of economic development of territories, and the participation of individual economic entities - representatives of different regions in the creation of a certain type of value expands its capabilities. What about the competitive advantage of an individual economic entity in the value chain concept?

Perhaps this task remains relevant for a participant in interregional interaction, and the issue of competition will be appropriate in relation to enterprises that produce similar types of products, work or services, but are not involved in a joint process.

Porter's idea was developed in their research by contemporary economists, which, as a result, resulted in the emergence of a large number of classification groups and types of VC Fig. 1.

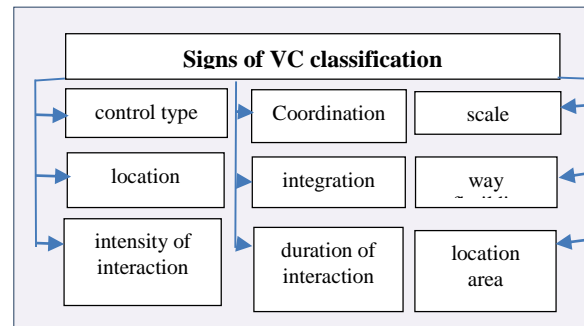


Fig.1. Signs of VC classification [8-15]

Each classification group includes several types of VC identified by individual authors with a certain set of differences from the original according to M. Porter, the versatility of which has contributed to the expansion of the possibility of using it in various industries, conditions and scales of interaction between business entities. The relevance of using VC in assessing potential interregional ties is dictated by new opportunities in organizing and managing the process of creating value in the context of digital transformation of economic processes and the possibilities of distributed production.

This type of production of values is a form of decentralized production that has come into practice for enterprises with production facilities geographically distant from each other, the coordination of which is carried out through the use of information technologies.

It is rather difficult to isolate and analyze production links of this nature due to the lack of the necessary information. However, if we turn to the sectoral features of a certain region, allowing the creation of a VC in the context of basic industries, it becomes possible to assess the region's ability to interregional interaction.

And, in this situation, one should consider the type of VC in relation to a certain industry and assess the possibility of creating a certain product by business entities by representatives of different territorial entities. A positive aspect of such cooperation for the participants of the VC is,

on the one hand, the saving of costs for organizing functions that are not characteristic of them, on the other hand, the ability to focus on the main activity, bringing it to perfection and improving the quality characteristics of the produced values.

## II. METHODS

General scientific methods of analysis and synthesis were used as research tools, as well as specific research methods such as: monographic method, abstract-logical, calculation-graphic, economic-statistical, comparative financial-economic analysis, etc.

## III. MAIN PART

The authors proposed a methodological approach to assessing the region's ability to interregional interaction

The stages of the assessment activities and the areas of assessment corresponding to the individual stage:

Stage 1. An assessment is made of the contribution of individual industries to the growth of the GRP of a territorial entity and forming the foundation of the region's economy.

2. Stage. Potential value chains of basic industries, managed by producers, managed by consumers. The participation of the region's key industries in global value chains is assessed.

3. Stage. The potential territory for the location of value chains of the basic industries of the region (micro-level, meso-level, macro-level) is analyzed

4. Stage. The industry's attachment to the resource component of the production process of value creation is assessed.

5. Stage. The initiative of an industry or an economic entity in a specific value chain is assessed. Involvement in the process can be the result of an independent decision of the organization to conclude contracts for the joint creation of a certain good, or the opportunity to participate in the implementation of a national project or fulfill a state order. This characterizes the strength and duration of joint activities of business entities.

The proposed methodological approach involves the study of the features of the regional economy in order to answer the question: how, in conditions of limited production factors and economic benefits, to find an algorithm for solving the problem of full and efficient use of society's resources?

Let us consider the structure of the GRP of the South Siberian macroregion in order to determine the participation of basic industries in its formation (Table 1).

TABLE I. GRP STRUCTURE OF THE SOUTH SIBERIAN MICROREGION % (2017) [13]

Base industries	GRP of a separate region					
	A	B	C	D	G	H
Agriculture, hunting and forestry	18,1	20,1	-	4,9	9,2	-
Manufacturing industries	5,7	18,9	16,5	13,4	37,3	9,4
Building	9,9	-	-	-	-	5,7
Wholesale and retail trade; repair of vehicles, motorcycles, household goods and personal items	15,0	14,1	9,6	16,8	11,7	9,1
Real estate operations, rental and service provision	6,9	11,9	7,6	22,9	9,9	13,5
Public administration and military security; social insurance	14,8	7,1	5,7	5,1	5,4	5,2
Education	8,9	-	-	-	-	4,4
Health care and social services	6,3	5,6	4,9	4,4	4,4	
Other activities	14,4	14,5	13,4	15,3	13,8	13,7
Production and distribution of electricity, gas and water	-	-	5,0	-	-	-
Transport and communication	-	7,8	7,6	17,2	8,3	11,7
Mining	-	-	29,7	-	-	27,3

A - Altai Republic; B - Altai Territory; C - Kemerovo region; D - Novosibirsk region; G - Omsk region; H - Tomsk region

The basic industries of the South Siberian macro-region are:

1. Agriculture, hunting and forestry
2. Manufacturing industries
3. Construction
4. Wholesale and retail trade; repair of vehicles, motorcycles, household goods and personal items
5. Operations with real estate, rent and provision of services
6. Public administration and military security; social insurance
7. Education
8. Health care and social services
9. Other activities
10. Production and distribution of electricity, gas and water
11. Transportation and communication
12. Mining

The basic branches of territorial entities also determine the VC, the classification group and the type.

The predominant share in the structure of the GRP of the Altai Territory is occupied by agricultural products and industries processing these products, which is not surprising for an agrarian region. Manufacturing industries and agriculture form the bulk of the GRP of the Omsk region. Forestry and hunting products prevail in the GRP of the Altai Republic. In the Tomsk and Kemerovo regions, a significant share of the GRP is associated with the extraction of minerals. The formation of GRP in the system of trade relations and the service sector is typical for all territorial entities. Transport infrastructure revenues prevail in the GRP of the Novosibirsk region. Revenues from other types of activities, such as health

care, education, government administration, are present in the GRP structure of each region, since the industries are life-supporting. In the structure of shipped products of the manufacturing industry by the territorial entities of the South Siberian macroregion, the largest share is taken by the products of metallurgical production, metal products, except for machinery and equipment. The second position is occupied by the production of coke and petroleum products; production of rubber and plastic products and third place - food production; beverage production; production of tobacco products. The leaders in coal shipment by type of economic activity "Mining" in 2018 are Novosibirsk and Kemerovo regions. Omsk and Tomsk regions are the leaders among the regions in the production of crude oil and natural gas. Altai Territory specializes in the extraction of metal ores. The leader in the segment "Agricultural products of the regions of the South Siberian macroregion in 2018" is the Altai Territory. In the volume of retail trade and public catering turnover, the volume of sales for personal consumption significantly exceeds the volume of sales in wholesale trade.

The basis for effective interregional interaction is the construction of a value added chain that does not weaken, but forms, or enhances the competitive advantages of business entities - links in this chain. This requires a scientific approach and is based on the results of the analysis. The value chain is intra-sectoral or, if the current situation requires it, inter-sectoral. The purpose of such an analysis is to study interrelated types of economic activity and create a logistics system as a set of individual actions of participants in manufacturers, transport companies, trade organizations, ensuring their effective interaction and expressed in obtaining an added value acceptable for each organization (link in the chain) corresponding to the designated level in the planning and management system of the organization. The process of commodity circulation in the value added chain should be built on the basis of cause-and-effect relationships and patterns, relying in the process of interaction of economic entities on effective organizational forms and methods of managing the flows of material and information resources.

This is important at the stage of building the value chain, since the process of its transformation can be accompanied by significant financial investments.

Let us consider the structure of value chains and assess the possibility of division of labor in the process of production of material values - products of the basic industries of the South Siberian macroregion.

It is appropriate to start with an analysis of the production process of agricultural products, since there is a direct connection with organizations that carry out processing and are part of the processing industries. This kind of connection is explained by the specificity of agricultural products, namely, by a limited storage period. As a rule, the distance from the point of production to the point of its complete processing should be such as to ensure the preservation of the properties of raw materials for the production of quality products and their further transportation to the final consumer. One of the main conditions for the production of agricultural products is the geographical location of producers' organizations, the availability of arable land and land for growing feed. Own fodder base, in turn, is one of the main factors in the development of the livestock sector of agricultural production. As a rule, the product value chain is formed within one region, and an additional link may arise at

the stage of selling to buyers - legal entities, retail chains geographically located in other regions of the federal state and beyond. The scale and territory of the VC location can determine the capacity of the regional market, the scale of activities, production volumes, quality characteristics of the product in comparison with analogues and pricing policy, which provides additional demand and competitiveness. In 2018, according to statistics, a positive trade balance in the structure of food products is observed in the following segments: cheeses, cheese products, butter, butter pastes, ghee, flour and cereals. This circumstance may indicate the participation of organizations - manufacturers and wholesale trade organizations in the meso-level VC, but at stages with different added value. As a rule, it is minimal at the production stage. The predominance of import over export in the structure of the main types of products is observed in the positions of livestock and poultry products (meat and poultry meat, except for offal, canned meat and meat-containing products, sausage products) and plant growing (vegetable oils, white beet or cane sugar in a solid state without flavoring or coloring additives). In the VC, the organizations producing livestock products act as suppliers of raw materials, and, therefore, with a minimum added value.

The production of coke and petroleum products can serve as a basis for believing that enterprises producing such products are participants in the global value chain, a characteristic feature of which, as in other types, should be called unevenness. A chain is considered global with the participation of links located in different geographic regions of a particular state and beyond.

To assess the ability of regions for interregional interaction, a number of factors were selected that affect the process of value creation and its distribution among the participating links (Table 2).

TABLE II. INDICATORS FOR THE RATING ASSESSMENT OF THE ABILITY OF THE REGIONS OF THE SOUTH SIBERIAN MACROREGION TO INTERREGIONAL INTERACTION

Criterion	Region					
	1	2	3	4	5	6
The number of basic industries with leading positions in the GRP structure	3	3	3	3	3	3
Value chains of the main industries in the region, including:						
manufacturer-driven	1	2	2	2	1	1
consumer driven	2	1	1	1	2	2
Territory where value chains are located, including:						
Microlevel						
Mesoscale	2	2	2	2	2	2
Macro level	1	2	2	1	1	1
Attachment to resources, including:						
Production	2	1	2	1	2	1
Labor	-	-	-	-	-	-
Natural	1	1	1	-	1	-
Initiative in organizing interregional interaction:						
Organization	3	3	3	3	3	3
State order	-	-	-	-	-	-
National project	-	-	-	-	-	-

1. Republic of Altai 2. Altai Territory 3. Kemerovo Region 4. Kemerovo Region 5. Novosibirsk Region 6. Omsk Region 6. Tomsk Region

For the rating assessment of the ability to integrate the regions of the South Siberian macroregion, we selected the regions that have three basic industries with clearly expressed leadership positions in the GRP structure. Based on the proposed

methodological approach, a rating assessment of the region's predisposition to interregional interaction was carried out. The indicators used in the assessment process are presented in Table 1.

Based on the results obtained, a coefficient was calculated that characterizes the predisposition of territorial entities to integration. The weight coefficients of the factors involved in the calculation are presented in Table 3. from the point of view of the impact on the amount of value added by the organization-participant.

TABLE III. VALUES OF WEIGHT COEFFICIENTS OF FACTORS INFLUENCING THE INTEGRATION PREDISPOSITION OF THE REGION OF THE SOUTH SIBERIAN MACROREGION

Index	Designation	Weight coefficient
Value chains of the main industries in the region, including:	X <sub>1</sub>	
manufacturer-driven	-	0,7
consumer driven	-	0,3
Territory where value chains are located, including:	X <sub>2</sub>	
Microlevel		0,1
Mesoscale		0,8
Macro level		0,1
Attachment to resources, including:	X <sub>3</sub>	
Production		0,45
Labor		0,05
Natural		0,5
Initiative in organizing interregional interaction:	X <sub>4</sub>	
Organization		1
State order		2
National project		2

The coefficient characterizing the region's predisposition to integration is determined by the formula:

$$Ir = \prod_i^n X_m \quad (1)$$

Or

$$Ir = \sum kX_1 \times \sum kX_2 \times \sum kX_3 \times \sum kX_4 \times \sum kX_5 \quad (2)$$

The calculation results are presented in Table 3

TABLE IV. THE VALUE OF INDICATORS FOR ASSESSING THE INTEGRATION CAPACITY OF THE REGIONS OF THE SOUTH SIBERIAN MACROREGION (I<sub>ik</sub>)

Factor	Altai Republic	Altai region	Kemerovo region	Novosibirsk region	Omsk Region	Tomsk Region
X <sub>1</sub>	1,3	1,7	1,7	1,7	1,3	1,3
X <sub>2</sub>	1,7	1,8	1,8	1,7	1,7	1,7
X <sub>3</sub>	1,4	0,95	1,4	0,45	1,4	0,45
X <sub>4</sub>	3	3	4	3	3	3
Ir	7,4	7,45	8,9	6,85	7,4	6,45

#### IV. CONCLUSION

The study made it possible to draw a conclusion about the ability of territorial entities to integrate processes in the context of the existing sectoral structure, climatic features, to a certain extent both limiting and expanding certain capabilities of the region in participating in value chains of various types.

The Kemerovo Region has the greatest propensity for interregional cooperation, which is explained by the presence of basic industries that make it possible to participate in various value chains, including as part of the dominant links.

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