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Development of Entrepreneurship in Industry on the Basis of Regulation of Transnational Production Chains in the Russian Arctic

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***Abstract*—**In the national economy, entrepreneurship plays the role of a buffer between economy and policy for it contributes to improving budget effectiveness and decreasing dependence of economy on the state. Entrepreneurship in industry makes it possible to increase the added value that is formed in production chains and to decrease dependence on import. Under the current circumstances, when sanctions are being imposed, this is especially relevant for Russia and for the realization of projects in the Russian Arctic. However, development of entrepreneurship in industry requires an enlightened state policy. The purpose of the research is elaboration of recommendations for improving economic effectiveness of the realization of the Arctic projects on the basis of conceptual proposals for the development of entrepreneurship in industry. The paper presents the studies of the extractive industry role in the Russian economy and proves its raw material character. The analysis of production chains in industry on the basis of the conception of the added value global chains demonstrated a low added value formed by Russian companies. The study of changes in the structure of economy based on systemic, statistical and comparative analyses revealed no positive changes in the structure of economy over the period under consideration. This is a manifestation of ineffectiveness of the Russian industrial policy in general and within the Arctic region in particular. The authors identified the problems information and implementation of the state industrial policy in the Arctic region and in the development of national entrepreneurship, analyzed the shortcomings of the current state policy in the sphere of the Russian industry. On the basis of the conducted studies, the authors formulated conceptual approaches to change the state policy in the Arctic. The basic idea of the authors is to substantiate the focus of the state regulation on the development of entrepreneurship in industry in the process of the Russian Arctic exploration. At the same time another problem is solved–that of the development of the manufacturing industry in the southern regions of the northwestern part of Russia. The criterion of effectiveness in this case is the economic effectiveness.

***Keywords*—**Entrepreneurship in industry, global chains of the added value, government regulation, industrial policies, production chains in the Arctic region, economic effectiveness.

I. Introduction

THE growth of global chains of the added value over the last two decades not only significantly changed the nature of the world economy, but also had a strong influence on individual countries. The positive impact of global chains is achieved due to the multiplier effect of investments in the economy. This is reflected in the development of related industries, in the increase of the coordination of production chains and the added value they create, and in the development of entrepreneurship. At the same time, there are negative aspects of the development of global chains, in particular, the exclusion of the resident enterprises from national markets, resulting in losses of the added value for the national economy.

Over the last few years there has been formed the image of the Russian Arctic as a national storehouse of mineral resources, hydrocarbons dominating among them. As a result, the problem of effective utilization of these resources is gaining in importance. The raw material orientation of the Russian economy is recognized by everyone, and the government is taking steps to change this situation. It is necessary to ascertain the effectiveness of the existing industrial policy regarding the development of the Russian economy in order to correct it as far as the Arctic region is concerned. Entrepreneurship in industry enables one to enhance the added value formed within production chains and to lower import dependence. It is suggested to focus the efforts of the state industrial policy on the development of entrepreneurship in industry. Small industrial enterprises have much flexibility and are able to get involved in production chains in quite a short time. There is a need for the state regulation of production chains on the basis of the development of entrepreneurship in industry so as to increase the added value created by Russian companies taking part in the development of the Arctic.

II. Methodology

The methodology of the research is based on scientific works by Russian and foreign scientists in the area of the world economy, governmental regulation and entrepreneurship. For example, to determine the role of the mineral resources of Russia in the global and national economy we used the theory of comparative advantage, which utilizes indicators suggested, for instance, by D. Greenway, C. Milner in 1993 [25].

The analysis of the effectiveness of Russia's participation in the global extractive and manufacturing sectors is performed with the usage of the conception of global chains of the added value introduced in 1997, primarily as a conception of commodity chains which focused on logistics flows, and then,

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since the beginning of 2000, on the added value chains. The latter conception outlines the major factors of the organization of global industries, suggests a theoretical basis and practical tools for the analysis of the added value chains and different types of managing them [19].

There are different approaches to the analysis of global chains of the added value. First of all, the use of a number of quantitative indicators should be noted, of which the most widely used are:

1) The index of vertical specialisation (VS) [22]. This indicator is based on national cross-sectoral balances and was first introduced by [18], [23].
2) The index of vertical specialization (VS1), representing a proportion of exported goods and services that are used as an intermediate import for the production of export goods of other countries, suggested by [22].
3) The index of participation in global chains of the added value calculated as a proportion of foreign intermediate goods and domestically produced intermediate goods, used in the export of the third countries (percentage of a country's gross exports is a statistical measure).
4) The length of the chains measured by the index, interpreted as a real number of manufacturing steps and calculated on the basis of cross-sectoral balances: [20], [21], [17]. The minimum value of the index is equal to one, when no intermediate goods or services are used for the production of the final product.
5) The indicator of the distance to the final demand, indicating the number of manufacturing steps, which the product or service must take on their way to the final consumer in specific industries and individual countries [21].

Besides, we should note the methodology of [5], aimed at obtaining expert assessments from a wide range of respondents who are both inside the chain and outside of it, which make it possible to character rise the schemes of the value accumulation chain, determine the composition and role of its members, identify the potential for the added value growth in the age of market globalization.

The importance of the global added value chains is recognized by all of the participants of the world market and, therefore, the OECD in cooperation with the WTO developed a methodology to assess the trade flows in terms of the added value on the basis of cross-country, cross-sectoral balances and full matrices of bilateral trade flows. The ICIO model allows analyzing in detail the global value chains and transactions between different sectors and countries in 37 sectors of the global economy [7], [24].

The contribution of Russian scientists should also be noted. For instance, in this paper we used some theoretical and methodological positions of [10], who consider a production and processing chain in the context of the extractive and petrochemical industries in Tatarstan. Of much value are the works by [7], who systematized researches into the global added value chains and conducted comparative studies in different economy sectors in different countries.

Fragmentary researches into the problem of the global chains functioning are considered in a number of works from the perspective of competitiveness management of integrated companies [1].

From the point of view of the theory of entrepreneurship, there are three basic approaches to its characterization:

1) «Creative destruction» as an entrepreneur's function. An innovative entrepreneur creates a new company thus getting the economy out of the state of homeostasis and putting it on the track of development [16].
2) An entrepreneur's income is a reward for being ready to act in a context of uncertainty, for example, [9].
3) An entrepreneur keeps the economic cycle in balance [15].

In this research entrepreneurship is analyzed from all the three perspectives described above.

The problems of researching and developing the Arctic are discussed in the scientific literature quite actively, but at the same time, in most cases they only touch on certain aspects: environmental, technical, social, economic ones, etc. In particular, the works exploring the challenges of the regional economy and industrial policy should be noted [2], [3], [6], [13]. However, we identified no complex researches into peculiarities and the state of development of the Arctic region from the position of global chains and state regulation of these processes from the perspective of economic effectiveness.

An analysis of global added value chains in the Arctic is of interest in terms of the methodology because:

- under the sanctions there are several problems connected with participation of individual countries and companies caught by those sanctions; this fact puts a number of projects in jeopardy and states that one of the ways to solve the problem is to revise the composition of the participants from the point of view of risk mitigation, added value and economic effectiveness;
- companies of different countries take part in the global Arctic chains, and there are certain objective difficulties of counting the results of their participation, and consequently analyzing the added value as distributed among the participating countries and types of activities. In addition, statistical data in different countries are processed in different ways, and there are some difficulties of comparing these results. These problems mainly apply to the added value in particular regions, for example, in the Arctic; the Arctic region of Russia, formally limited to certain areas, will become an object of Russian statistics no sooner than in 2015.

III. Research

To clarify the role of the mineral resources of Russia in the national and global economy there were conducted researches with the usage of the theory of comparative advantage (Table I). For the calculation of the indicators the official statistical data of the Russian Federation were used [8]. The research results show the comparative advantages of mineral products as compared with the total volume of foreign trade activities of the Russian Federation, which is achieved due to the predominance of the export component over the import one.

The analysis of the participation of Russia in the global chains was carried out on the basis of the international statistical data [24]. The results (Table I) reflect the low level of the vertical integration (VS), a relatively low contribution of extractive (8.6–18.5%) and manufacturing (3.6–7.6% for mineral products) enterprises in Russia to the added value, created by the global chains within the period under consideration. The length of the chains in the extractive industry is slightly higher than its worldwide average in the industry, which is traditionally minimal [7].

The obtained results prove the raw material character of foreign trade activities, clarify the fact that the comparative advantages of mineral products are reached mainly due to the export of resources, the degree of vertical integration is low. This fact makes it possible to state that these comparative advantages are tactical and do not ensure the competitiveness of the Russian economy in the world market in the long term because, first, the mineral resources are limited, second, the added value created by Russian companies in this sector of economy is limited, and, consequently, economic effectiveness is limited as well.

TABLE I
ANALYSIS OF THE COMPARATIVE ADVANTAGES OF RUSSIA

Indicators	2000	2005	2008	2009	2010	2011	2012	2013
Export,bnroubles	103,1	241,5	467,6	301,7	397	516,7	524,7	526,4
Export of mineral products, bnroubles	55,5	156	326	203	272	368	374	377
Import, bnroubles	33,9	98,7	267,1	167,3	228,9	305,8	317,2	317,8
Imports of mineral products, bnroubles	2,1	3	8,3	4,1	5,2	9,9	7,5	6,9
RCA1in total	0,5051	0,4198	0,2729	0,2866	0,2686	0,2564	0,2465	0,2471
RCA1, mineral products	0,9271	0,9623	0,9503	0,9604	0,9625	0,9476	0,9607	0,9641
RCA2, mineral products	0,0076	0,0022	0,0003	0,0010	0,0006	0,0002	0,0003	0,0003
VS, mineral products	0,0204	0,0124	0,0178	0,0136	0,0131	0,0192	0,0143	0,0131
The length for all the sectors of the global economy	1,81	1,82	1,86	1,83	n/a	n/a	n/a	n/a
The length of the chains in the extractive industry	1,8	1,6	1,5	1,6	n/a	n/a	n/a	n/a
The length of the chains in the manufacturing industry, mineral products	1,8	1,9	2,0	2,1	n/a	n/a	n/a	n/a
Participation in global added value chains, in total, %	38,8	49,3	51,0	44,9	n/a	n/a	n/a	n/a
Participation in global added value chains, extractive industry, %	8,4	18,5	17,8	17,5	n/a	n/a	n/a	n/a
Participation in global added value chains in the manufacturing industry, mineral products, %	4,7	6,6	7,6	5,1	n/a	n/a	n/a	n/a

Note: A) *RCA1*= (*Xij - Mij) / (Xij+ Mij)*– the index ofthe «revealed comparative advantage» including the export and import of the product which allows us to define the comparative advantages based on intra-sectoral trade (D.Greenway, C. Milner, 1993), whereX– export, M – import, i – the country under study, j – commodity (or an area of industry); B) *RCA2*= (*Xij*/ *Xit*) / (*Mij*/ *Mit*) = (*Xij*/ *Mij*) / (*Xit*/ *Mit*) –the index of comparative advantages, suggested by D.Greenway, C. Milner and based on the equality of Balass, whereXandM – export and import respectively, i – country, j – commodity (or an area of industry), t – group of commodity (or an area of industry); C) the index of vertical integration VS - the proportion of imported goods in the total export of the country.

The analysis of the dynamics of investments in the Arctic region and extraction of its main production resources showed virtually no correlation of capital investments and their impact, which indicates in effectiveness of investments.

In our opinion, one of the main reasons for this situation is an ineffective industrial policy in the sphere of utilization of mineral resources in the Russian Federation, including the Arctic region. As additional arguments we will present the results of the analysis: the proportion of the added value in different sectors of the economy (Table III), the coefficient of advancing in industrial sectors (Table III) and the forecast of the index of the participation of Russian companies in the global chains (Fig. 1).

The obtained results allow us to state that the added value of the extractive industries is more than 30%, which confirms the raw material character of the economy. The comparative dynamics of coefficients of advancing shows no visible changes in the economic structure. Consequently, the state industrial policy does not influence the economic development of the Russian Federation, which proves its ineffectiveness.

Besides, basing on the available data (up to 2009) we carried out an approximation of the change of the index of participation of Russian companies in global added value chains (Fig. 1), which shows that in the current period its growth could reach 2.5 (high accuracy), provided that there is an efficient state industrial policy.

TABLE II
THE DYNAMICS OF THE EXTRACTIVE AND MANUFACTURING INDUSTRIES

Indicators	2010	2011	2012	2013
Gross added value (extractive industry), %	34,00	35,70	37,50	37,30
Gross added value (manufacturing industry), %	52,50	51,80	50,80	51,10
Coefficient of advancing in extractive industries	0,96	0,97	0,98	1,01
Coefficient of advancing in manufacturing industries	0,97	0,96	1,07	1,08
Coefficient of advancing of crude oil and natural gas extraction in industry	0,95	0,96	0,97	1,01
Coefficient of advancing of crude oil and natural gas extraction in extractive industry	0,99	0,99	1,00	1,00
Coefficient of advancing of coke and petroleum products production in extractive industry	1,02	1,02	1,02	1,01

Note: The coefficient of advancing is calculated as the ratio of the growth rate of certain types of activities (sectors) T_{branch} to the growth rate of a group of activities (all industries) $T_{industry}$

So, the Russian economy, despite all the efforts of the state, remains predominantly raw material in its nature. That is why, among other reasons, the Arctic, whose continental shelf, as estimated by the Ministry of Economic Development of the

Russian Federation, in favorable conditions is capable of providing up to 25% of Russian oil and up to 30% of its gas [14] – is very attractive for development. In contemporary conditions of political, social and economic instability utilization of natural resources of the Arctic shelf opens up new opportunities for economic development of the country. A unique resource potential of the Russian Arctic strengthens Russia's geopolitical position in the world community, promotes its integration into the world economy and allows it to get certain benefits for the national economy. At the same time, investments in the development of the Arctic region do not give due results at the present stage.

In our opinion, the problem lies in the fact that in the Russian Arctic areas transnational production chains originate that cover almost all the technological cycle including extraction, development and utilization of hydrocarbons, meanwhile the Russian participation from the position, formed within the added value, is insignificant. From our point of view, this situation needs to be corrected.

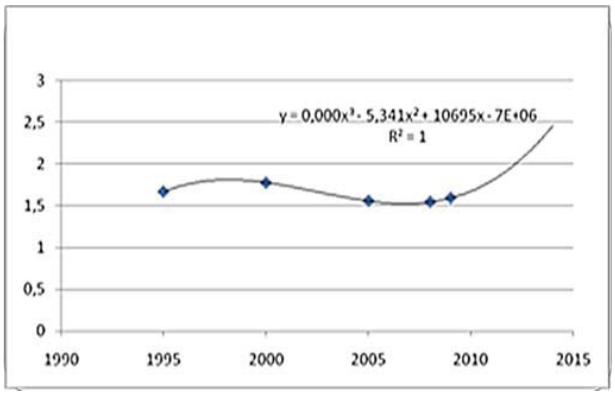

Fig. 1 Changes of the index of participation of Russian companies in global chains

TABLE III
A CHARACTERISTIC OF SMALL ENTERPRISES IN INDUSTRY

	2012		2013			2014		
	The number of small enterprises		The number of small enterprises		Average staff size	The number of small enterprises		Average staff size
	thousand	% of the total	thousand	% of the total	Persons, thousand	thousand	% of the total	Persons, thousand
Total	243,1	100	234,5	100	6452,2	235,6	100	203,3
Extraction of minerals	1,0	0,4	1,0	0,4	36,8	1,0	0,4	1,3
Manufacturing industries	35,4	14,6	34,0	14,5	1135,7	33,6	14,3	25,7
Production and distribution of electric energy, gas and water	3,5	1,4	3,4	1,5	113,7	3,4	1,4	5,0

In the current situation activities of the largest Russian extracting companies, functioning as links of transnational production chains, are the main sources of replenishment of the state budget. As a result, nonrenewable natural resources, a national treasure, are used irrationally. Therefore, it is necessary to strengthen the state regulation of the processes of organization and development of production chains on the basis of development entrepreneurship in industry, defining national interests as main criteria. This means that we should use a methodology of assessing the economic effectiveness of production chains, presupposing a comparison of all the obtained effects, including indirect, socio-economic, environmental ones, etc., with the expenses underlying them.

Table III presents a characteristic of small enterprises in industry by the number of enterprises and staff size of these enterprises [12]. It is obvious that as the number of small enterprises increases, their proportion in industry goes down. It demonstrates ineffectiveness of the state industrial policy in the sphere of entrepreneurship.

The principles of the state policy in the Russian Arctic zone are reflected in the Decree of the Government of the Russian Federation of April 21, 2014 № 366 (in the wording of December 17, 2014) "On approval of the state program of the Russian Federation "Socio-economic development of the Arctic zone of the Russian Federation for the period until 2020" and in the strategy of development of the Arctic zone of the Russian Federation and providing national security for the period until 2020. These documents define the objectives and priorities of the state policy in the Arctic, the degree of participation of subjects of the Russian Federation and state corporations, joint stock companies with state participation, social, scientific and other organizations. However, a critical analysis of the state programme of development of the Arctic made it possible to point out the following problems.

First, the integral system of state regulation of the Arctic territory, and therefore its object and subject are not entirely clear. To be fair, we should note the establishment of the Government Commission on the Arctic, whose functions and powers are being defined, the identification of the Arctic projects control center and the formation of the Arctic zone development programme.

Second, undeservedly little attention, in our opinion, is paid to such an important issue as the effective utilization of the Russian Arctic resources as a basic material for the development of the country, its regions, mainly located in more southern areas with better conditions for life and development of the manufacturing industry. In other words, the Russian Arctic mineral resources should be considered as the basis for modernization and qualitative growth of the national economy, entrepreneurship in industry, as the means of solving major problems associated with the country's economic self-sufficiency.

The idea of providing deep recycling of the Russian Arctic hydrocarbon resources is reflected in the national project "The Russian Northwest is an economically self-sufficient macroregion" [13], in which it is supposed to create in the regions located within the Northwestern Federal District, major high-tech enterprises, aimed at deep recycling of the Arctic hydrocarbon resources, producing internationally competitive products, including import-substituting ones, what is determined, primarily, by considerations of the national economic security and the implementation of the general policy of import substitution.

Besides, such enterprises can act as drivers of the economic development of the regions - the place of their dislocation, as it boosts the development of entrepreneurship in related sectors, for example, in manufacturing of accessories as well as in food manufacturing. Essentially, we are speaking about reformatting (full or partial) of the existing transnational production chains, the basis of which should be constituted not only by benefits of domestic resource extraction corporations, but also by national interests; what is more, solutions in this sphere should be based on the criterion of economic effectiveness of the planned reforms, its state audit [13].

To justify the locations of the new manufacturing enterprises, that it is proposed to create, we conducted the research which, according to the criteria of possibilities (availability of production facilities and expertise) and the energy consumption of GDP and GRP (Table IV), demonstrate the expediency of placing these enterprises in the Novgorod and Pskov regions.

The main condition for the implementation of this plan is having the political will, strengthening the state regulation in this sphere, conducting a nationally oriented industrial policy, in which interests and intentions of the state in terms of the effective utilization of the Arctic natural resources should be clearly defined. Such policies should contribute to achieving and/or increasing the economic self-sufficiency of the country.

We think that by means of conducting an effective state economic policy in the Arctic region and in the northwest of Russia it is possible to intensify the activity of national enterprises and authorities on developing entrepreneurship in industry and forming production chains of deep recycling of the Arctic hydrocarbon resources, mainly with participation of Russia. The object of this policy is the transnational production chains of the mineral resources sector enterprises with Russian participation and entrepreneurship activities in industry. In this situation there arises a virtually unexplored problem of increasing economic effectiveness of Russian companies' participation in production chains, because the proportion of the added value created within these chains depends on the link that involves productive forces of a particular country, and even more – on the balance of the political forces and competitive interaction of interests in the global market [4].

Fig. 3 presents a conceptual structure of the state control system with its subject (on the federal, regional and local levels), its centre in Arkhangelsk and its object, whose activity can take place in different districts of the Russian Federation and other countries and on the local level of government.

TABLE IV
THE ENERGY CONSUMPTION OF GDP AND GRP [12]

Region	Energy consumption	Relative energy consumption, calculated on the basis of GDP	Relative energy consumption, calculated on the basis of GRP
Northwestern Federal District	226,97	1,7226	1,4056
Republic of Karelia	252,65	1,92	1,5647
Komi Republic	206,10	1,56	1,2764
Arkhangelsk region	189,33	1,44	1,1725
Vologda region	591,20	4,49	3,6614
Kaliningrad region	106,16	0,81	0,6575
Leningrad region	257,96	1,96	1,5976
Murmansk region	235,80	1,79	1,4603
Novgorod region	178,97	1,36	1,1084
Pskov region	175,96	1,34	1,0897
Saint-Petersburg (city)	75,51	0,57	0,4676

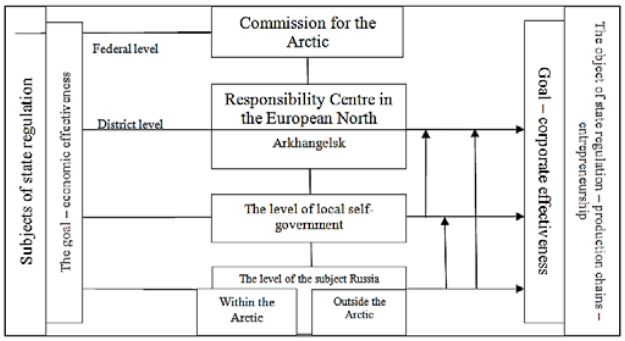

Fig. 3 The conception of the system of state regulation of production chains on the basis of development of entrepreneurship in industry in the European North of the Arctic region

Normal functioning of the system requires harmonization of the interests of the subjects and objects of state regulation, which are reflected in the scheme in the form of goals. These goals in most cases are contradictory, as they reflect the interests and intentions of various government and business entities (state, subject of the federation, local authorities, businesses). If we define harmonization of goals as the achievement of the mutual agreement of all the subjects and objects of state regulation on the basis of consideration of their mutual interests and intentions, in which the goals are clear and accepted by all the subjects and objects, do not cause counteraction, are perceived by them as their own and all actions are aimed at the realization of common goals, then harmonization of goals makes it possible to get the functional balance of interests of subjects and objects, provide the degree of balance with each other, which ultimately allows one to function and develop in the intended direction. This ensures a stable status of all subjects and objects and overcomes possible contradictions in their actions.

Convergence of interests and positions achieved in the course of harmonization results in removal of tension, resolves differences and ensures the implementation of the main goal of the state policy – increasing economic effectiveness of activities. Thus, the current level of harmonization of intentions and interests of the subjects and objects of the state policy is the

main criterion for building its priorities in the regulation of production chains on the basis of development of entrepreneurship in industry in the Arctic projects.

IV. Results

On the basis of the conducted investigations the following conclusions and suggestions can be formulated.

1. In general, the effect of the production chains functioning is recognized by the overwhelming majority of researchers. At the same time, economic effectiveness depends more on the number of national participants of global chains. A production chain is formed both with a tactical purpose – for its participants to get more profit – and with strategic ones, such as implementation of large-scale projects of the national economic development, development of entrepreneurship in industry, formation of integrated systems of regional management, development of production chains, which corresponds to the conditions and requirements to development of the Arctic hydrocarbon potential. The government can and should play different roles in forming production chains on the basis of development of entrepreneurship in industry: from that of an active participant to that of the subject of the formation of the production infrastructure (for instance, transport infrastructure), contributing to the establishment of stable global chains with the Russian participation on the territory of the country (region) and outside of it. We disagree with the views of the authors [11], that government regulation of such chains does not satisfy parity, because it does not take into account the subjects' interests. We believe that the interests of the objects and subjects need to be harmonized, as noted in the report of the OECD, WTO and UNCTAD for the Leaders Summit of G-20 in St. Petersburg on the consequences of global value creation chains (2013) [10].
2. As the proposals to change the state regulation of the participation of Russian companies in global Arctic chains in the north-west it is suggested to use the conception of the system of the state regulation of production chains in the European North of the Arctic region on the basis of development entrepreneurship in industry with the definition of its centre. The main purpose of this centre is to coordinate the participants of the Arctic projects in the northwest - the state, businesses, science and education, in order to harmonize their interests in the area of economic effectiveness.

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