TRANSBOUNDARY CLUSTERS IN THE COASTAL ZONES OF THE EUROPEAN PART OF RUSSIA: INVENTORY, TYPOLOGY, FACTORS, AND PROSPECTS

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This article presents an inventory and a typology of the existing and emerging economic clusters in the coastal zone of the European part of Russia. The authors hold that transboundary clustering takes priority in the Baltic coastal region — nine of the 56 clusters identified are located in the Kaliningrad region and another eight in Saint Petersburg and the Leningrad region. The authors describe major catalysts and immanent inhibitors in coastal zones. The former include a high density of coastal economies, proximity to international markets, and better logistics and communications. The inhibitors comprise geopolitical risks and institutional barriers. It is shown that the potential and prospects of transboundary clustering are affected by both global integration and disintegration patterns, coastal infrastructure, geopolitical and geoeconomic 'neighbourhood', cultural excellence, and business and investment environment.

Key words: economic cluster, coastal zone, transboundary cluster, cross-aquatic cluster, European Russia, Baltic region

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Introduction

23 regions and 166 municipal and urban districts in Russia are coastal. 74 urban centres are located directly on the coast. There are 49 seaports significant for the country, as well as many other maritime objects and the infrastructure of five strategic units of the Navy of the Russian Federation. Large-scale maritime economic complexes have developed and are sustainably functioning along the sea borders of the country (primarily in the Arctic and the Pacific zones of Russia) [1]. Large districts of the country lie at close proximity to the sea, which determines their spatial, economic and settlement patterns, their fronts facing the coast of the European part of Russia. These are North-West

federal district with its centre in St. Petersburg, the most powerful Russian coastal city agglomeration, and with its exclave coastal region, unique for the country [2; 3]); and Southern Russia, with 67% of the population concentrated within 200 km drive from the coast. In this regional context, no solution to any kind of socio-economic issues (including the construction of a 'new geography of economic growth' which is one of the priorities in the "Strategy of National Security of Russia" (2015) [4]) is possible without striking an effective balance between continentalization and coastalisation [5]. In turn, this stipulates further development, discussion and implementation of an interdisciplinary maritime research agenda [6]. This field of research involves, as one of its main tasks, the monitoring of economic clustering in coastal zones, including the conjunction of this process with the transnational cross-border activity. To this end, the immediate purpose of this article is to provide the inventory and typology of cross-border clusters in the coastal zones of the European part of Russia, as well as to identify the factors and characteristics of their localization and development.

Cross-border economic clustering: specificity of coastal zones

Clusters (including cross-border ones) are one of the basic forms of modern economy organization [7—16]. Their attribute characteristics are: a certain degree of homogeneity and comparability of their elements, supersum emergence and spatial concentration with a high degree of components' autonomy, as well as internal balance of competition and cooperation [1]. These mechanisms of clustering at the regional and local levels are used to achieve economic efficiency and competitiveness in the context of increasing global interdependence [8]. To top all that, clusters create the need for additional resources for informational, technological, manufacturing, logistic and trade cooperation and staff exchanges. Such resources grow in the conditions of increased cross-border contacts between the cluster components which are located on different sides of a border [11; 12].

On the one hand, Russia has followed the global trend and adopted the cluster concept to theorize and understand business and administrative processes of clusterisation that have already been unfolding in regional economies. On the other hand, the cluster concept itself (including its various interpretations) became the reason to form a particular vision of trends and prospects for regional development. So the concept became a backbone element of the system, resulting in both self-organizing processes of business enterprise and the administrative directives aimed at the formation of clusters [17]. Such directives are reflected at various levels of territorial administration [18], including legal and strategic documentation [19].

Coastal zones are — or can become — spaces with the increased saturation of inter-organizational contacts, especially cross-border and cross-aquatic ones [20]. Their other distinctive feature, *ceteris paribus*, is a faster pace of economic development [6]. Not only do such zones have the most

favourable conditions for economic clustering, but they are also in a special way 'predisposed' to localize cross-border phenomena and contacts, as well as to generate the effect of multi-cross-bordering, which happens because of the presence of sea ports and associated infrastructure.

The most significant factors of cross-border clustering observed observed in the coastal zones of Russia are as follows:

— high density of economic, institutional, transport and logistic, consumer and demographic-economic space;

— distancing from the inland economic cores of the country and the largest transport-economic closeness to the exogenous centres of contemporary geo-economics; a kind of economic bi-contact ability (inclusion in both domestic and foreign relations and processes that generates the positional characteristics of a 'double periphery' and 'multi-dependence');

— richness of the information environment, including high opportunities for transmission of tacit knowledge through business communications and staff exchanges;

— higher competition thanks to the relative ease of external players entering the market coupled with more favourable institutional conditions for integration into international structures and markets;

— instability of development, high frequency of changes in the economic objects' regimes of functioning, as well as changes in the 'rules of the game' for cross-border interaction; consequently, the need to find additional internal and external sources of stability, and a relatively more rapid accumulation of experience;

— larger role of geopolitics and the presence of military block in economic development;

— special role of maritime component in the economy of coastal zone, as this segment of economy is cross-border in its essence, its core element is port and logistics complex which is generally integrated into the global system of maritime transport.

The 'marine', or 'maritime', economy itself characteristically becomes the ground for clustering [21], inducing this process in related industries. In this case, according to analytical evidence collected by the authors in all 14 coastal regions of the European part of Russia, the cross-border clustering is now in the process of finding its multiple invariant manifestations and forms. It is developing most extensively and consistently in the territories, which are not only the most powerful in attracting population, infrastructure, economic activity, but also have the mission of becoming critical geo-economic corridors for the country and its leading innovative communications centres.

Typological diversity of clusters in coastal zones

The mechanism of identifying clusters and potential cluster formations has to be multilateral and comprehensive, combining the methods of expert evaluation and analysis of statistical indicators — both direct and calculated,

in territorial breakdown and time series. It should also include the study of strategic and contractual documentation of enterprise groups, their interactions and positioning in the domestic and foreign markets, as well as the presence of cluster identity and the existing forms of institutional representation and aggregation of interests. Based on the methodical approaches by both international [22] and Russian [1] researchers, the multivariate analysis allows for the identification and inventory of emerging and potential clusters in coastal regions of the European part of Russia. A comprehensive method to identify cluster formations used in this study included not only the fixation of clusters with official status and state registration, but also the analysis of regulatory documents of those, which build their own economic and legal space without the organizing role of any state projects. It also allowed to carry out a statistical analysis of the dynamics of economic entities in the relevant sectors of all regions considered, including the number of small and medium-sized enterprises and the economic value of their activities. On the basis of enterprises' information resources, we made a qualitative assessment of the intensity degree of inter-organizational interaction, including cross-border and cross-aquatic interaction. We then analyzed the dynamics of the consolidation-downsizing of enterprises in the sectors of high organizational density. Our analysis included the monitoring of such processes as the acquisition of production facilities abroad and the implementation of major investment projects jointly with foreign investors.

Among the qualitative parameters constituting the database matrix were such indicators, as: the industrial specifics of a cluster; the nature of reasons for its coastalisation; the importance of a cluster to the regional economy; the degree of development (measured in terms of the intensity of inter-organizational interactions and also the real competitive conditions of coexistence for the constituent entities of a cluster); the presence of official registration and any institutional forms to represent a group interest; the peculiarities of territorial structure and clearly marked "nuclei of attraction"; the presence of port facilities serving a cluster (or its own port and ship repair facilities, formed as a result of diversification or vertical integration of the enterprises); the presence of research and education organizations serving the basic infrastructure of a cluster and being able to become the structure-forming cores (or potentially enhancing clustering trends); the nature of the cross-border and cross-aquatic ties.

The presented multi-factor qualitative analysis allowed us to identify 56 emerging and potential clusters in the coastal regions of the European part of Russia. These were grouped into four main typological forms based on the comprehensive identification of correlation relationships between the recorded values of the clusters' qualitative parameters. The given classification is true for both regional and sectoral snapshot, and for the groups of clusters with various degree and nature of institutionalization and organizational forms.

It is appropriate to include 25 clusters into the category of **'maritime clusters'** (or ***'clusters of a primary production coastalisation'***). To the moment, they have formed in such industries as shipbuilding and repair, port

logistics services, fisheries, seaside tourism, and in the mining industry (along with extraction of energy resources on the continental shelf, amber mining in coastal zones also may be assigned to this category).

In recent years, the clustering processes have been dynamically occurring in fishing and fish farming, the port logistics sector, shipbuilding and ship repair industries (including military-industrial complex). They are confined mainly to the regions of the European North and North-West of the country. However, such clusterisation is mostly triggered by the government contracts, with an obvious focus on Saint-Petersburg, the Leningrad region and the Arkhangelsk region, while other ports and shipyards are gaining the "subordinate" status. On the other hand, we observed self-organizing trends of modernization in the relevant and significant regional industries along the Western border of the Russian Federation, and in in the Caspian basin. To the moment, this duo-centered shipyard cluster has formed a sustainable cross-border cooperation. Its centres are based in the Leningrad region (Vyborg) and in Finland (Helsinki). This cluster is the part of the USC Joint Stock Company and includes such participants as PJSC "Vyborg Shipbuilding Complex", "Arctech Helsinki Shipyard" and "Hietalahti", which form its main "nuclei of attraction" [23].

A significant group of clusters identified in the coastal regions is functioning in cooperation with industries and enterprises of the maritime complex but does not belong to the maritime sector itself. So, this category of clusters is of a market-service nature of attraction to sea (we define it as ***'clusters of secondary production coastalisation'***). There are also typologically related clusters, localized in the major settlement centres at the coast (this case can be defined as ***'clusters of localizing coastalisation'***).

In this segment, clustering takes place thanks to several related trends, the main of which are: the necessity of import substitution at the domestic market in the civil maritime sector, and the reinstatement of military-industrial maritime complex with the need for concomitant high technology product giving rise to the relevant government orders. The formation of IT clusters and the clusters of knowledge-based engineering is subordinate to global trends and combined with their structuring into sub-clusters. It reflects an objective trend towards increased diversity, greater specialization and the growth of complexity of the final product. It is significant that three relatively independent IT-production clusters are in the process of forming in the Kaliningrad region, an exclave where the "critical mass" of producers and potential consumers is yet to accumulate. These clusters are specialized in communication technologies and equipment, development and implementation of software, and the entertainment IT-technologies. Despite a minor position in the economy of the region, some of the clusters of this category will probably play an essential role in overcoming the production hyper-centralization in the regional centre and attract highly qualified personnel in the Eastern part of the region (the town of Gusev and its adjacent areas).

The active development of IT-cluster also takes place in the Rostov region, but here the division into sub-clusters have not yet happened, and the existing regional potential of enterprises is only able to reach clustering "critical mass" in terms of diversity of their production and service profiles. In the sphere of research-based engineering we see both trends unfolding in the same region: narrow specialization of cluster product, and the opposite one — a combinatorial multiplication of ideas and technologies in cooperation between enterprises of various specializations. The "Maritime Systems" cluster in Taganrog is an example of the focusing strategy, while the opposing trend is presented by such groups as the "Southern Constellation" cluster, whose product is being developed for the military-industrial complex and the civil sector industries (space and maritime aviation, high-technology instrumentation, etc.) simultaneously. The "critical mass" of members to achieve the cluster effect is typically about 5—10 companies for small narrow-specialized clusters and about 20—30 for the diversified ones.

Potential proto-cluster formations in the field of IT-technologies are now visible in the economy of St. Petersburg, and in the field of instrument engineering — in Sevastopol. It is this type of clusters in all the regions studied that has the highest level of group consciousness of economic entities. Group interest is presented in the form of cluster centres, which is either a development institution or an association of IT producers, community councils, clubs of directors, or similar institutional structures. Apart from IT and engineering, some clusters in other sectors could be classified as the clusters of secondary production coastalisation. These are: mining, tourism and building cluster in the Krasnodar region, as well as metallurgical cluster in the Murmansk region, which also emphasizes the role of research and education.

Localization and communication factors help form another large typological grouping, **'marine-dependent' clusters**. They are based on the use of sea transport opportunities ('***trade and logistics coastalization'***) and function either in the structure of the port-industrial complexes themselves, or at a greater distance from the sea within the hinterland of large seaports.

The most expressed is the 'trade and logistics coastalisation' for sunflower-grain clusters of the South of Russia (centered primarily on the Rostov region and formed around the largest business structures: "Yug Rusi", "ASTON", "RZ Agro", etc.), food cluster of the Kaliningrad region, and the chemical mining cluster of the Murmansk region, in the sales structure of which the share of sea freight is significant. It is this category of clusters that can be primarily attributed to the trans-aquatic type (or possessing the potential of trans-aquatic development). Referring to the basic industries for each of the localization regions, they play a significant, if not dominant, role in the regional economy and mostly display a polycentric or network structure with 50 to 80 stakeholders. The location of the cluster nuclei on different sides of the aquatic space is typical for the proto-cluster of agricultural machinery in the Rostov region; such development strategy is associated with the need to achieve economies of scale through the search for additional foreign demand and, consequently, the shift of production centres towards the consumer.

Some clusters localized in the coastal zone show ***'insignificant trade and logistics coastalisation'*** (the category can also be described as 'clusters with the predominance of land links'). Having varying degrees of 'presence' in regional economies, they are related to the agro-industrial complex, primarily — meat and dairy industry serving both local and inter-regional demand. These are the turkey and dairy clusters of the Rostov region, the sheep breeding cluster of the Republic of Kalmykia; the innovative cluster of biotechnologies in the Rostov region; the machine building, or automotive, cluster of the Leningrad region; timber industry and woodworking clusters of the Leningrad and Arkhangelsk regions; the furniture cluster of the Kaliningrad region; and individual segments of the tourist cluster of the Arkhangelsk region.

Cross-border and trans-aquatic properties can be both immanent in the clusters of each of the above-mentioned categories, and retain their potentiality due to the favorable opportunities for inter-subject integration in the coastal zone. The nature and degree of the 'overlap' of the cross-border and trans-aquatic factors of development also serve as grounds for classification. It is thus expedient to identify: 1) cross-border trans-aquatic clusters; 2) cross-border clusters without the influence of the 'marine factor'; 3) trans-aquatic clusters with the potential for cross-border development.

Based on the actual diversity of cluster initiatives presented in the coastal zones of the European part of Russia, the proposed typology makes it possible to record a number of important properties of cluster formations, as well as qualitative parameters of their interrelation with cross-border and trans-aquatic vectors of development, both in the regional section and in the coordinates of the sectoral affiliation, the degree of significance for the regional economy, the specifics of the territorial structure, the availability of organizational forms and centralization, the integration with the system of science, education and innovation development, the interrelations with port complexes, etc. At the same time, it is also possible to isolate the characteristic features of the spatial localization of clusters corresponding to the social and geographical realities of modern Russia.

Factors and features of cluster localization in the coastal regions of the European part of Russia

Globalization and rapid advancement of Russia into the system of market relations of the post-Soviet period (complemented by the impact of agglomeration effects, urbanization and metropolisation factors) predetermined, on the one hand, a perceptible 'shift' of productive activity, infrastructure, population to the sea (symptomatically, in 1989—2016 the total population of the coastal cities of Russia increased by 6.2%, or 794 thousand people), on the other — initiated a further 'stratification' of the maritime zones in terms of the level and rate of socio-economic dynamics. The process of economic clustering, against this background, is observed in nearly all coastal regions, acquiring, simultaneously, a pronounced regional specificity.

Localization of clusters (in particular, clusters with clearly expressed cross-border characteristics) takes place, first of all, along the main transport and logistics corridors that ensure geo-economic positioning of Russia. This pattern is most strikingly seen at the Russian coast of the Baltic Sea — a priority for the country (whose foreign trade, even in the context of the tensed relations with the West, is 42 % oriented toward the European Union), its foreign trade and communication. The most indicative in this respect is the concentration of cluster initiatives in the Kaliningrad region, where eight clusters are identified as 'formed' and one — as 'potential'.

Clusterogenesis in coastal zones (including the sectoral profile of clusters) is undoubtedly influenced by natural and climatic, resource-economic characteristics of the territory. For example, agrarian clusters prevail in the Azov-Black Sea macrozone, while fisheries, mining, timber industry tend to cluster in the Barents-White Sea. An additional weighty factor of clustering is the process of metropolisation and the associated concentration of population and infrastructure in the dominant urban centres: St. Petersburg, Rostov-on-Don, Kaliningrad, Sevastopol, etc. St. Petersburg coastal region, the largest (on the scale of the entire coastal zone of Russia) conglomeration of demographic and economic potential, also has the most substantial clusterogenic potential. It is symptomatic that it hosts the four large clusters of national importance: shipbuilding, port-economic, forestry, automotive (Fig. 1).

Synchronous and distinctly pronounced processes of cluster formation in both the marine sectors and in the related areas, including the localization and development of defense industry enterprises, are characteristic for the economies of St. Petersburg, Leningrad and Arkhangelsk regions. At the same time, the high-tech industries of 'secondary coastalisation' of these regions are either 'built-in' into a single cluster structure or have not yet been affected by clustering.

In the Caspian macroregion, due to the greater 'sparseness' of the economic space (than on the Baltic coasts, the Krasnodar Krai, or the Don delta), the subjects of the economy are less affected by clusterogenic processes, but the latter manifested themselves in the sectors of 'primary coastalisation' (except for the Republic of Kalmykia). The same applies to the coastal zones of the Republic of Crimea and the city of Sevastopol.

Local conditions of the business environment in its direct interaction with the regional administrative elite also have a significant impact on clustering. It is characteristic that in the absence of established clusters in the Krasnodar Krai (where the holding model of integration predominates and the institutional factors and peculiarities of the business environment of the region hamper clustering), the neighbouring Rostov region acts as a leader both in terms of the number of institutionalized cluster initiatives and clusters with prolonged (more than ten years) lifetime. Most of the Rostov clusters do not belong to the primary production coastalisation, but they experience the influence of the coastal factor, serving those, or using their trade and logistics potential.

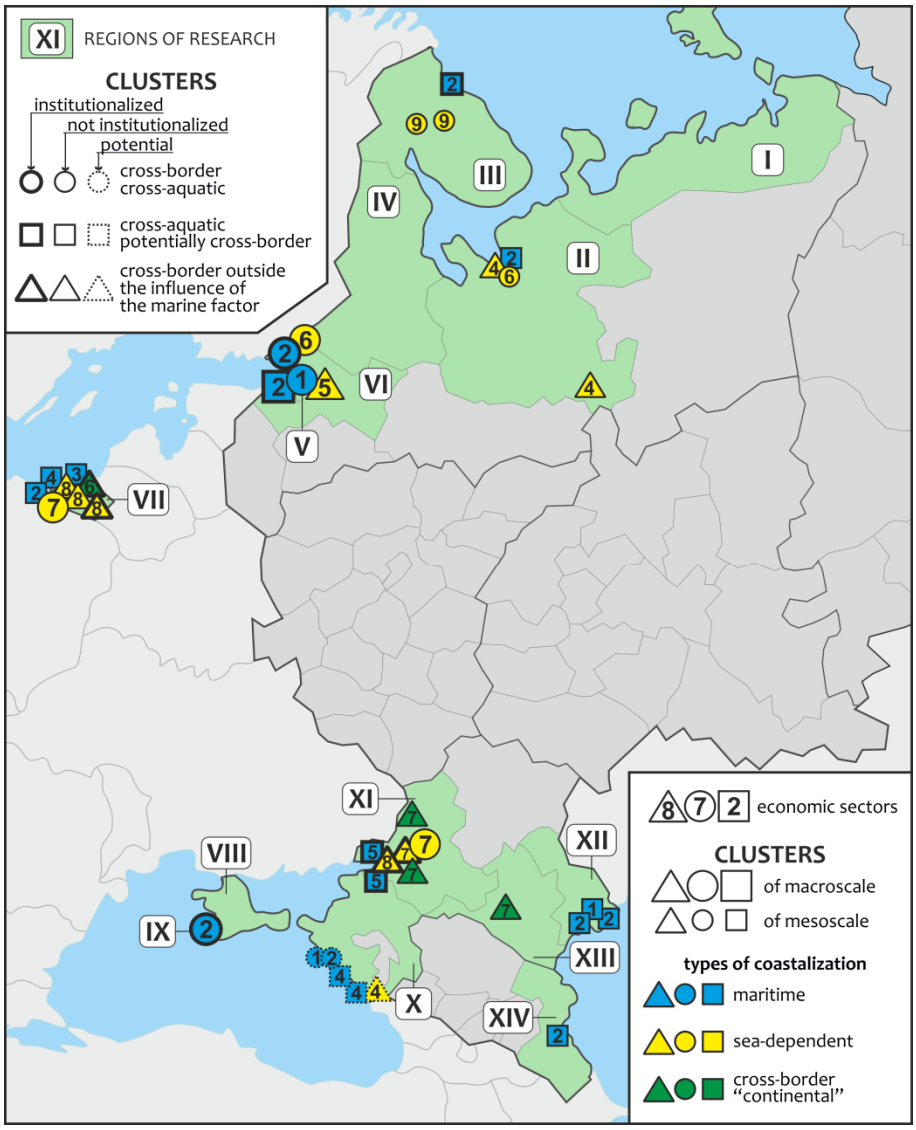

Fig. 1. Localization of cross-border clusters in the coastal regions of the European part of Russia

Coastal regions: I — Nenets Autonomous Okrug; II — Arhangelsk region; III — Murmansk region; IV —Republic of Karelia; V — St. Petersburg; VI — Leningrad region; VII — Kaliningrad region; VIII— Republic of Crimea; IX — Sevastopol; X — Krasnodar Krai; XI — Rostov region; XII — Astrakhan region; XIII — Republic of Kalmykia; XIV — Republic of Dagestan.

Types and areas of economic activity: 1 — port facilities and shipping; 2 — shipbuilding and ship repair; fishing and mariculture; 3 — extraction of minerals on the shelf; 4 — tourist and recreational complex; 5 — mechanical engineering; 6 — chemistry and forestry; 7 — agro-industrial complex, 8 — IT, 9 — metallurgy, mining and chemical industry

Source: elaborated by authors.

Special geopolitical and geo-economic conditions for the functioning of the economy inherent to certain segments of the maritime zone are important for clustering. This is especially evident in the specifics of the Crimea and the Kaliningrad region, where, in the presence of pronounced common features (geographic exclave-enclave position, greater dependence on the international context, the existence of special economic and legal regimes), the processes of clustering, nevertheless, differ significantly.

In the Crimea, they are limited to the direct effect of economic sanctions, the presence of institutional barriers to inclusion in the all-Russian economic space, as well as the arrival of large non-regional capital, which folds local organizational potential. In Kaliningrad region, on the other hand, there many years of experience of centrally-peripheral interaction with both the 'Greater Russia' and with neighbouring states, so it's not uncommon that clusterogenic impulses themselves come from outside, and the resulting clusters acquire a cross-border (trans-aquatic) character. Similar trends are also unfolding in the regions of the north of the European part of Russia.

Conclusion

Cross-border clusters formed in the coastal zones are immanent to the economy of the Russian Federation; their states and characteristics mirror their situational and fundamental defects, problems, 'weak places': from the actual underutilization of the 'sea factor' in the territorial-economic dynamics, to the hypertrophied 'raw materials' bank', the withdrawal of assets and profits beyond the limits of Russian jurisdiction. The prospects and risks of cross-border clustering are the most tangible on the marine coasts of compact, winding, infrastructurally equipped coastlines, encircled by highly developed countries and regions with a significant level of mutual economic and cultural integration. In the case of the European part of Russia, these are the Baltic and, in part, the Black and Azov Seas. It is here, in the centre-peripheral architecture of the marine cross-border metaregions (polycentric only in the Baltic Sea), where the scale of the inclusion of coastal zones of Russia in transnational integration processes is the most visible; and the likelihood of adoption of the peripheral or semi-peripheral status by the Russian coastal territories is equally high. This requires the utmost attention to the processes of cross-border clustering, their vectors, geo-economic and geopolitical effects, projections on regional identity — especially in such geographically important regions of Russia as the Kaliningrad region.

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