

# Economic clusters in coastal areas of the European part of Russia: typological invariance and specifics of localization

## Clusters económicos en zonas costeras de la parte europea de Rusia: tipológica invarianza y especificidades de localización

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#### ABSTRACT:

The article contains an overview of existing and potential cross-border economic clusters located in the coastal zone of the European part of Russia.

Classification of clusters is carried out in accordance with the nature of coastalization: primary and secondary production, strong and weak trade and logistics, which makes it possible to distinguish such typological forms as a cluster of coastal industry affiliation (primary and secondary), a cross-border trans-aquatic cluster, and a cross-border cluster with land links predominance. The empirical part of the study is presented by a database compiled by the authors on the basis of the collected extensive factual material. An analysis is made of the main factors and trends of clustering in the coastal zone, with identification of catalyst and inhibitor factors of cluster self-organization, the institutionalization of cluster formations, the transboundary and trans-aquatic activity vector.

**Key words** economic cluster, coastal zone, cross-border cluster, trans-aquatic cluster, Russia

#### RESUMEN:

Español Inglés Portugués El artículo contiene una visión general de los clusters económicos transfronterizos existentes y potenciales ubicados en la zona costera de la parte europea de Rusia. La clasificación de los racimos se lleva a cabo de acuerdo con la naturaleza de la coastalización: la producción primaria y secundaria, el comercio fuerte y débil y la logística, lo que permite distinguir las formas tipológica como un conglomerado de la industria costera la afiliación (primaria y secundaria), un racimo transacuático transfronterizo, y un racimo transfronterizo con predominio de los acoplamientos de tierra. La parte empírica del estudio es presentada por una base de datos compilada por los autores sobre la base del material de hechos extensos recolectados. Se analizan los principales factores y tendencias de la agrupación en la zona costera, con la identificación de factores catalizadores e inhibidores de la autoorganización del clúster, la institucionalización de las formaciones de racimos, el transfronterizo y el trans acuático Vector de actividad.

# 1. Introduction

Cross-border clusters are among the basic forms of organization of modern economy. The achievement of high economic efficiency and competitiveness through clustering mechanisms at the regional level (Porter, 1985) is complemented by the need for an additional resource of industrial, technological, logistic, etc. interaction and personnel exchange, which grows when cross-border contacts are involved. Being inherently a transboundary phenomenon (Druzhinin, 2017), the economic cluster is a co-opetitive (i.e. cooperative and competitive; Ghobadi and D'Ambra, 2012) environment of regional self-organization (Gorochnaya, 2014), open to multilateral interaction, modifying its own territorial structure with the inclusion of new nuclei located on different sides of the border.

The coastal zone is the area of increased saturation of inter-organizational (and in particular transboundary and trans-aquatorial; see Bilchak and Bilchak, 2015) contacts, often understood as a specific territory of intensified socio-economic activity (Alaev, 1977) that shows outstripping rates of economic development and is featuring a permanent inter-transition of integration of enterprises dependent on external and internal macro-cycles (Druzhinin and Gorochnaya, 2016). The use of maritime transport contributes to the multiplication of the contact potential of cross-border interaction, the achievement of the effect of poly-transboundary (Druzhinin, 2016a), simultaneous intensive accumulation of tacit knowledge (Bathelt et al., 2004; Evers et al., 2010) and experience of inter-organizational interactions. Along with these characteristics, the coastal zones as the clusterogenic area have nodal elements, the 'condensation nodes', generally represented by the seaports and associated infrastructure facilities (Druzhinin et al., 2015). The maritime and coastal economy becomes a field for clustering (Baturova, 2012), and it also induces this process in related industries.

The contemporary scholarly discourse on the issues of cross-border cluster formation, including those localized in the coastal zones, requires further methodological development and elaboration. The article focuses on the development of approaches and tools for detection and identification, typologization and classification, as well as in-depth assessment of the nature and the specifics of the transboundary and trans-aquatic component of clustering.

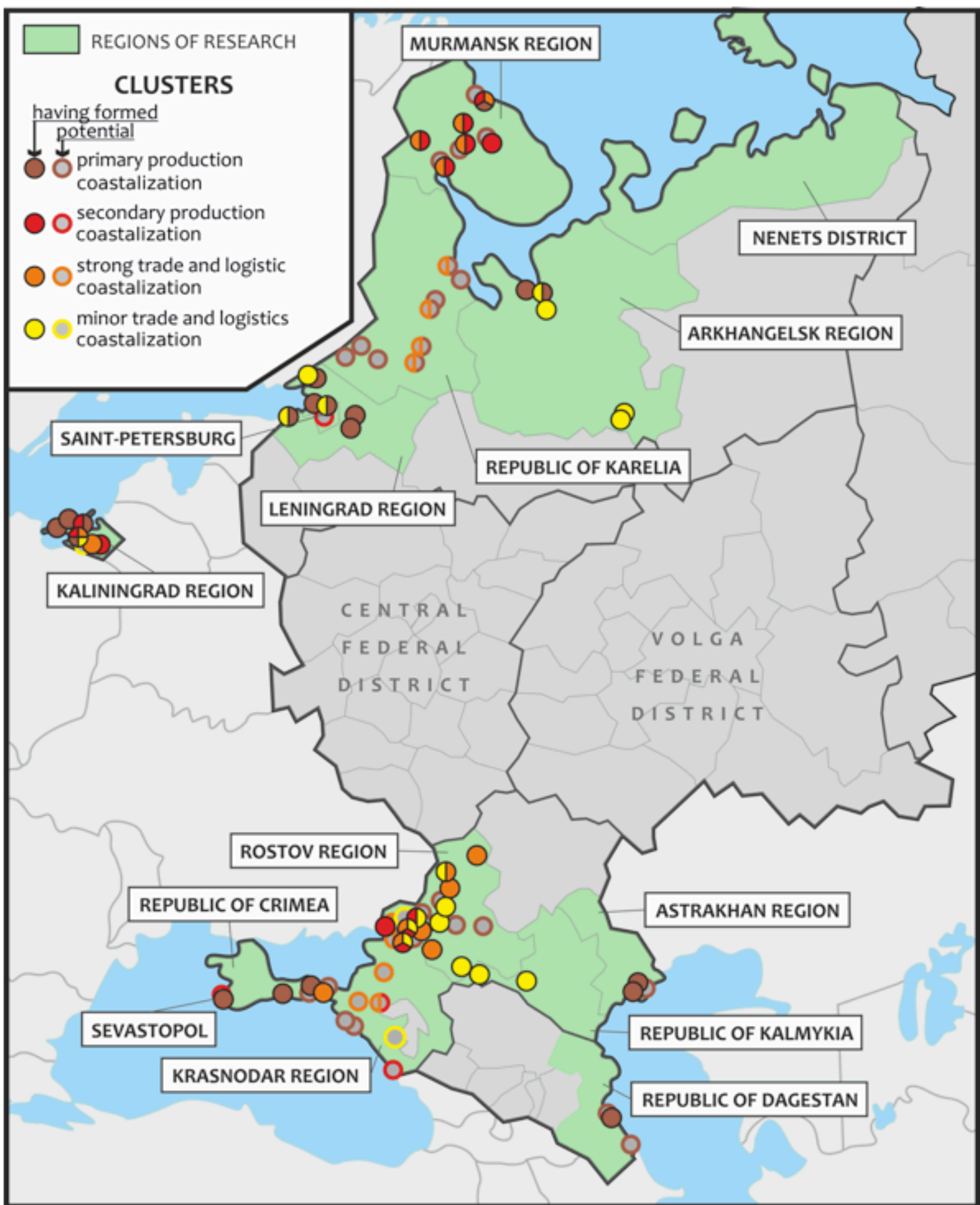
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## 2. Methodology

The cluster mapping as a special form of economic cooperation and integration projected on the toolkit of their identification is tested on the empirical-factual material of the coastal territories of the European part of Russia. The present study is based on a qualitative multivariate analysis of the database compiled by the authors on 56 formed and potential clusters (figure 1), identified on the basis of the techniques developed by Druzhinin (2016b, 2017), Mikhailov and Mikhailova (2012), Walerud and Viachka (2007).

### Figure 1

Spatial distribution of analyzed economic clusters  
in coastal areas of the European part of Russia



On the basis of the analysis, well-defined typological forms of clusters were identified, namely: maritime by the production specifics (primary production coastalization), maritime complex supporting services (secondary production coastalization), functional adherence to the maritime logistics (trade and logistics coastalization), and cross-border clusters dominated by land links, but with the presence of maritime links (insignificant / potential trade and logistics coastalization).

With that, the transboundary and trans-aquatic properties can be manifested within the cluster of each of the above-mentioned categories, or they are not, being potentially embedded in it due to the increased opportunities for integration in the coastal zone. This classification 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 development vectors, both in the regional context and in the coordinates of industry affiliation, the degree of significance for the regional economy, the specifics of the territorial structure, the availability of organizational forms and centralization, integration with the system of science, education and innovative development, interrelation with port complexes, etc.

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## **3. Results**

### **3.1. Coastal clusters of primary production coastalization**

The primary production coastalization is found in clusters in shipbuilding and ship repair, portside economy, fishing and fish farming, seaside tourism, and in mining (along with offshore energy production, this category also includes amber mining in the coastal zone). This category includes the formed port-economic clusters of the Astrakhan region, St. Petersburg and the Leningrad region; Shipbuilding and ship repair clusters of the St. Petersburg and the Leningrad region, the city of Sevastopol and the Republic of Crimea, Astrakhan, Arkhangelsk and Kaliningrad regions; Tourist-recreational and amber clusters of the Kaliningrad region; Clusters for the extraction and processing of marine bioresources of the Republic of Dagestan, the Astrakhan region and Murmansk regions.

The analysis of the empirical information grouped into a database shows that the real processes of clustering covered the sphere of fishing and fish farming, shipbuilding and ship repair (including the military-industrial complex), and the port economy. The predominantly clusterogenic processes in these sectors in the European part of Russia are localized in the regions of the North and North-West, and also partially in the Caspian Basin (Astrakhan region). Potential for the development of clusters in these industries is also found in the Rostov region (where the main obstacle to clustering is insufficiently active cooperation between enterprises in the presence of intraregional competitive potential) and in part – Krasnodar Krai (where the clustering is impeded by the established organizational structure of production complexes built on the holding principle with a complex combination of public and private capital).

The role of clusters in primary production coastalization industries is significant for most regions of their localization, and in the Leningrad region and St. Petersburg is dominant. It is insignificant only in the Kaliningrad region (with the exception of the amber cluster). Developing clusters in primary production coastalization are localized in the Republic of Dagestan, the Murmansk region (in fisheries and fish farming), and partly in the Kaliningrad region (amber and tourist clusters).

Another trend is found for the stagnating clusters of shipbuilding and ship repair in the Russian exclave – the Kaliningrad region, as well as in the territory of the Crimean peninsula, where the reduction of production volumes as a result of economic sanctions is particularly noticeable, as well as the partial ‘curtailment’ of the intraregional organizational space due to the transfer of local firms into external ownership. For example, the owner of the port complex of Baltiysk (Kaliningrad region) is the Novorossiysk Commercial Sea Port; the organizational space of the ship-repair cluster of the Republic of Crimea and the city of Sevastopol is currently being actively mastered by the economic entities of St. Petersburg. Along with the worsening economic conditions (making local production vulnerable to foreign competition and investment capacity of foreign capital), institutional barriers also exist, especially in the Republic of Crimea.

The development of clusters of primary production coastalization is, therefore, currently governed, on the one hand, by state order, due to the strategic importance of the industries of marine shipbuilding, repair and port facilities (with a clear focus on St. Petersburg, Leningrad and Arkhangelsk regions and the transformation into a subordinated status of other port and shiprepairing centers), on the other hand – self-organizing tendencies to modernize the profile and significant regional industries in the western Russian borderland, as well as in the Caspian

basin.

It should also be taken into account that the conditions for the economic development of clusters of this category in each case directly result from the initial features, capabilities and technical regimes of exploitation of natural resources. They determine the structure of geographical location and the degree of involvement of the strategic interest on the part of the state. In many cases, the operation of a natural and technical facility itself limits the possibilities for developing a competitive critical mass: the organizational potential is optimized based on the priorities of the compact placement of terminals that produce a diversified or complimentary product and services.

The most striking example is the Novorossiysk Commercial Sea Port, which includes 10 complexes, each having a narrow production specialization in handling oil products (OJSC IPP), ferrous metals (JSC Novorossiysk Shiprepairing Plant), cereals and oilseeds (JSC NZT), wood and container cargo (JSC Novoroslesexport), etc., as well as provision of auxiliary fleet services (JSC Novorossiysk Commercial Sea Port Fleet), packaging and storage of cargoes (JSC Novoroslesexport). However, one can also find an interesting example of cluster formation that overcomes this trend due to trans-aquatic international interactions. Such is the duocentric cluster of shipbuilding and ship repair of the Leningrad region with the centers in Vyborg and Helsinki, represented by JSC USC, Vyborg Shipbuilding Complex, Arctek Helsinki Shipyard and Hietalahti as cluster nuclei.

Another organizational and market structure is set by a variety of possibilities for the spatial location of port and ship repair facilities in the river-sea area, which can be traced to the example of the Rostov region. The competitive (and potentially cooperative) critical mass is accumulating in the region due to the production-diversification processes going in both directions: the own port terminals (and in some cases the ship repairing capacities) are created by large agricultural producers, while the original port-logistical business entities and their associations are diversified in the direction of production of those products that are the object of shipping.

### **3.2. Coastal clusters of secondary production coastalization**

Coastal clusters of secondary production coastalization are formed in industries that do not have direct connection with marine activities, but directly serve those industries. The analysis of the empirical base shows, the foremost clusterogenic tendencies within this sector are found to be in science-intensive machine building, instrumentation, communication and IT technologies in the Rostov and Kaliningrad regions. Their role in the economy of the regions at the moment is not significant, but it has a strategic potential for increasing competitiveness on the domestic (and partly on the external) market. Currently, the role of land connections is predominant for these clusters, but in the long term the role of maritime transport can increase, and in the case of establishing stable relationships with foreign partners, these clusters can acquire the trans-aquatic form. The exception is the activity of IT clusters for which physical transportation of the product is not required, However, the co-location with direct coastal enterprises-consumers is important, both in terms of business environment, and from the point of view of continuous monitoring of the testing process, implementation, use of the product.

The process of cluster formation in this area is governed by a number of interrelated trends, among which the greatest role is played by: the growing needs of the defense-industrial complex in the maritime sphere, which entails the need for a concomitant science-intensive product, generating the corresponding state order, as well as the need for import substitution in the domestic market in civil sphere of marine industries. The formation of IT clusters is also subject to global trends of active market growth. Currently, the process of increasing separation of IT clusters from clusters of science-intensive machine-building into sub-clusters is actively taking place, which reflects the objective tendency to increase diversity and narrower specialization of the final product, its complexity. It is significant that even a region such as the

Kaliningrad region, where the critical mass of both producers and potential consumers is not so great – initially three relatively independent clusters in IT production are formed, with specialization in: telecommunication technologies and equipment, development and implementation of software, as well as entertainment IT-technologies. Despite the small positions in the region's economy, some clusters of this category are called upon to play an important role in overcoming the hyper-centralization of production in the regional center and attracting highly qualified personnel to the eastern part of the region – the city of Gusev and adjacent settlements.

In the economy of the Rostov region, with the very formation of the IT cluster, there is a need for a clear awareness of the specifics of its final product, but the allocation of sub-clusters has not yet occurred. The potential available in the region is able to reach a critical mass only in conditions of multi-profile cooperation. In the field of science-intensive machine building in the Rostov region, both tendencies take place: the narrow specialization of the product cluster (Marine Systems cluster in Taganrog) and, on the contrary, combinatorial integration of ideas and technologies in the cooperation of enterprises of various specialization (such as the Yuzhnoe sozvezdie cluster, final product of which is equally developed for the defense-industrial complex and civilian sphere, the space and marine aircraft building industries, instrument making, etc.). For small highly specialized clusters, the cluster effect can be achieved with a critical mass of participants even up to ten enterprises, while for multi-specialized clusters this figure is 20-30.

It is noteworthy that the level of cluster self-awareness of economic entities is greatest in the sectors of secondary production of coastalisation. This is represented in the form of existing cluster organizations or associations (e.g. of IT producers, public councils, clubs of directors and similar institutional structures). Cluster centers in the Kaliningrad region are formed, while those located in the Rostov region can be considered as formed. Along with these industries, the metallurgical cluster of the Murmansk region, where the role of science and education also increases, can be classified as cluster of secondary production coastalisation.

It is the concentration around specific scientific and educational centers that caused the formation of a mononuclear structure for most clusters of the category under consideration. The enterprises are localized within one city district or agglomeration, the cluster potential is made up of technologies used and developed on a unified basis, as well as the system of contacts within the professional business community and with the regional administrative community is established. A polycentric structure is formed if a cluster is required of an additional critical mass of stakeholders. It is also characteristic for the metallurgical cluster of the Murmansk region due to its established production specifics. The individual IT clusters of the Kaliningrad region predominantly have the network structure, they do not reveal any significant gravitation to the territory and are based on various platforms of technological development.

Despite the fact that almost all clusters of the category in question serve domestic demand, they have the potential for further growth and entry to the foreign market, including through the establishment of international relations and the acquisition of a trans-aquatic character. This vector is officially declared, in particular, in the marketing strategy of the majority of science-intensive clusters of the Rostov region, oriented in the medium and long term to demand and joint production interest from the countries of Asia and Latin America.

By completing the review of the clusters of the secondary production coastalisation, we note that potential protocluster formations in the field of IT technologies are currently available in the economy of St. Petersburg, in the field of instrumentation – in the city of Sevastopol. Along with these industries, the potential mountain-tourist and construction cluster of the Krasnodar Krai can be classified as such.

### **3.3. Coastal clusters of functional adherence to the maritime logistics**

Trade and logistics coastalization historically appeared for many industries of the regional specialization. However, it has more or less manifestation for each of them. The most powerful and strong it is for sunflower-grain clusters in the Rostov region (formed around most major centers of cluster gravity: agro-industrial group of companies Yug Rusi, ASTON, RZ Agro, etc.), the food cluster of the Kaliningrad region, as well as for mining and chemical cluster in Murmansk region, in the sales structure of which there is a significant proportion of marine transportation. Also the category of trade and logistics coastalization would include some potential clusters. They are: forest industry cluster of the Republic of Karelia machine-building cluster in Rostov region, the clusters in the field of agriculture and food industry of the Krasnodar Krai.

It is this specific category of clusters to be in the first place attributed to trans-aquatic one (or having the potential for the trans-aquatic development). Pertaining the basic industries for each of the regions of localization, they play a significant or dominant role in the regional economy, for the most part have a polycentric or network structure, comprising from 50 to 80 participants. The location of the cluster cores on the different parties of the aquatic space is characteristic for a potential cluster of agricultural machinery in Rostov region. Its development strategy is associated with the need to achieve economies of scale through seeking for additional foreign demand and, consequently, the proximity of the production centers to the consumer.

Minor logistic and trade coastalisation is typical for a large number of clusters, localized in the coastal zone (this category can also be designated as "clusters, with a predominance of land relations"). With varying degrees of importance to the regional economy, they are developing in the spheres of agriculture (primarily meat and dairy industry supports the local demand, they are: the Turkey meat and Dairy clusters in the Rostov region, sheep cluster in the Republic of Kalmykia, innovation cluster of biotechnology in Rostov region), engineering (automotive cluster in Leningrad region), forest and wood industry (clusters in Leningrad and Arkhangelsk regions), the furniture cluster of the Kaliningrad region, and some tourism clusters in Arkhangelsk region.

Having reviewed the main sources and characteristics of coastalisation, table 1 presents the information on the total number of emerging and potential clusters recorded in the regions of the European part of Russia in the course of the survey.

**Table 1**

Emerging and potential clusters in the regions of the European part of Russia identified

Region	Cluster type						
	Primary production coastalisation		Secondary production coastalisation		Strong trade and logistics coastalisation		Minor trade and logistics coastalisation
	Formed	Potential	Formed	Potential	Formed	Potential	Formed
Astrakhan region	3	1	-	-	-	-	-
Republic of Dagestan	1	1	-	-	-	-	-
Republic of Kalmykia	-	-	-	-	-	-	1
Republic of Crimea and Sevastopol	1	1	-	1	-	-	-
Krasnodar region	-	2	-	2	-	1	-
Rostov region	-	3	3	-	1	1	3
Kaliningrad region	3	-	3	-	1	-	1
Leningrad region and city of Saint-Petersburg	4	-	-	2	-	-	2
Arkhangelsk region	1	-	-	-	-	-	3
Murmansk region	1	1	1	-	1	-	-
Republic of Karelia	-	2	-	-	-	1	-
<b>TOTAL</b>	<b>14</b>	<b>11</b>	<b>7</b>	<b>5</b>	<b>3</b>	<b>3</b>	<b>10</b>

## 4. Conclusions

Considering the given statistics, specific regional profile of clustering can be detected. The subjects of the Caspian macro-region is least covered by clustering processes. However, such processes have already manifested itself primary in the sectors of primary production coastalisation (with the exception of the Republic of Kalmykia). The same applies to the economy of the Republic of Crimea and Sevastopol.

Synchronous and pronounced processes of clustering in the maritime sectors and in industries with minor coastalisation are characteristic for the economy of St. Petersburg, Leningrad and Arkhangelsk regions. It is caused by the strengthening of the North-West marine transportations and the development of the military-industrial complex. High-tech industries of secondary coastalisation in these regions are integrated into a single cluster structure, or even not subjected to clustering. On the contrary, they became a platform for the formation of clusters in Kaliningrad and Rostov regions.

While there are similarities between Kaliningrad region and the Crimea on the change of mode to their involvement in international relations associated with the geo-economic "reversal" of Russia, the shortage of a critical mass, and the regime of free economic zones, the clustering processes in these regions significantly differ. In Crimea, they are limited by the direct effect of economic sanctions, institutional barriers of the inclusion in the national economic space, as well as the arrival of large capital from other regions, folding the local institutional capacity. In Kaliningrad region these processes of center-periphery interaction already have over a decade of experience, along with the important ongoing cross-border land and maritime contacts with neighboring countries. As a result the clustering pulses in many cases come from the outside,



so the most of the resulting clusters are of cross-border nature. Similar trends take place in the regions of North European part of Russia.

Interestingly, it is almost impossible to trace a coherent general clustering trends between the regions of the Azov-Black Sea macro-region. In the absence of the actual formed clusters in the Krasnodar region (where the holding model of integration takes place), Rostov region can be named a leader both in the number of cluster initiatives, which are currently institutionalized, and the number of clusters with more than a decade of experience functioning. The majority of clusters do not belong to the sectors of primary production coastalisation. However, they have a significant impact of maritime factor by serving such sectors, or using them in trade and logistics matter.

Significantly more similarities can be traced while analyzing the given data between Rostov and Kaliningrad (partly also in Murmansk) regions. This fact characterizes first and foremost the features and the quality of the regional business environment being in direct interaction with the regional administrative elites, as well as the specific inclusion of the region into the system of center-periphery relations. Thus, the specificity of clustering in modern Russia, while bearing a certain regional specificity, is devoid of a pronounced macro-regional unity and determined by the casual combinatorics of natural, technological, internal and external market factors as well as interaction of business environment, regional and federal elite.

## **4.1. Concluding remarks**

Clustering in coastal zones is a resultant of many diverse factors. The potential and prospects of this process depend not only on the integration-disintegration rhythm in global and regional scale, but also on the specific geopolitical and geo-economic "neighborhood" of certain parts of the coast, their constructed nature of infrastructure, economic and cultural attractiveness of the leading seaside urban centers, and the business and investment environment cultivated in them.

Considering the positional and the resource specificity of the coastal zones, the strategic target of their local clusters' development should be implemented on the basis of their potential orientation to the both domestic market and the demand in neighboring states (and the states related by maritime communications). Also in can be implemented through the ability of business entities (cluster members) to be flexible and reconfigure their marketing in accordance with spontaneously changing market conditions. Cluster initiatives naturally are consistent with the logic of post-Soviet, market-oriented spatial organization of society (Druzhinin et al., 2012) and are localized in the main 'corridors of development' within the leading and most dynamic coastal metropolitan areas (attractive for business, investment and migrants). Realizing this, one should also endeavor to expand and diversify the range of clustering due to the involvement of the semi-periphery and peripheral areas (by the measures of stimulating regional policy). The state support of clustering in the coastal regions of the Western contiguous of Russia with special economic conditions is no less important in the current geopolitical situation.

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