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MIGRATION DISTANCES IN RUSSIA: A DEMOGRPHIC PROFILE OF MIGRANTS

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The distance of migration is closely linked to life course events, which are, in turn, marked by age. It serves as a criterion for distinguishing migration from other forms of spatial mobility. This paper aims to calculate the average distance of domestic migrations in Russia between 2011 and 2020, considering various migrant profiles such as sex, age, and type of residential registration. The Euclidean distance between 130,000 geocoded Russian settlements was computed to estimate migration distances. These geospatial data enabled us to obtain estimations of migration distances by weighting the total distance of all migrations based on their respective numbers. The distance of internal migration was similarly estimated, taking into account age, sex, and type of residential registration. The findings revealed that 31.3 % of domestic residential relocations occurred within very short distances not exceeding 50 km, while 43.5 % took place within 100 km of the previous place of residence. Calculating the average migration distance allowed us to identify two peaks: one at the ages of 22—23, present only for men, and another at the ages of 50—70. In all other cases, there were no sex-specific differences in migration distances. Migrants who obtained permanent registration at their new place of residence tended to cover greater distances compared to those registered only temporarily. The shortest relocation distances were associated with the age of 16, which could be attributed to prospective students moving to the nearest town where a vocational school is located.

Keywords:
types of migrant registration, distance, women, men, age

State of research

Ernst Ravenstein claimed that most migrants move short distances, and migratory flows dwindle as the distance from the point of departure grows [1, p. 198]. His conclusion has been corroborated more than once: most migrants prefer to remain near their families, friends and social contacts, being

unwilling to lose the benefits of access to familiar public spaces and the social capital that they have accumulated, probably over a long period [2]. Amongst other significant factors are psychological considerations [3], attachment to the neighbourhood [4], and weaker awareness of distant territories than neighbouring areas [5; 6].

Of some importance, albeit lesser than that of potential economic gains, is the financial component of distance decay [7; 8], which does not grow in proportion to the distance but rises nevertheless. In large-area countries, such as Russia, not only does long-distance migration require much time and finance, but it is associated with substantial travel-related difficulties: the poor quality of roads, the unavailability of direct travel options, and the need to change between modes of transport. The nature and climate of one's region of origin may produce opposite effects: a migrant might strive to move to an area with similar or, on the contrary, entirely different conditions. Moreover, people may have very dissimilar ideas of these conditions. During our expeditions to Russia's North and Far East, we often encountered the opinion that one has to move to a place with a similar climate. This consideration was cited by residents of Sakhalin to explain the emergence of a 'Sakhalin colony' in St. Petersburg and the Leningrad region. Yet, we repeatedly heard the opposite: 12 % of respondents from Vorkuta named Krasnodar Krai as the preferred migration destination.

Along with external and context-dependent factors, the distance of migration is affected by the vicissitudes of one's life course events and the events involving one's friends and relations. It is generally believed that education is a principal migration-encouraging factor. A recent study [8] has shown that although it is the case in the UK and Sweden, where people move over more than 90 or 80 km respectively to their place of study, Australians rarely consider education a strong motive to change one's place of residence, regardless of the distance. Leaving the family home or divorcing a spouse are life events that often prompt people to migrate [9], usually over a short distance. Overall, the range of factors affecting the willingness to migrate and the distance of migration is vast [10].

For a long time, it has been assumed as an axiom that long-distance migration is motivated by career reasons and short-distance by moving house (the latter can be called residential mobility) [11; 12]. Housing considerations are a frequent cause of family migrations. The literature [8] links the growing importance of family reasons (broadly associated with de-standardisation of spatial-temporal life trajectories) to a decrease in the distance of migration.

Population migration is selective in terms of many characteristics, which has been demonstrated in a range of works starting with the 1938 book by Dorothy Thomas [13]. The characteristics that are most accessible for analysis are sex and age. Considering them as approximators of motives for migration events makes it possible to link the distance of migration and the dominant logic be-

hind the process. Particularly, studies conducted on the US [14] and Sweden [7] have shown that long-distance migration is more common among younger and more educated individuals. It has also been observed that having preschool-age children is associated with shorter-distance movement, while households with school-age children are less likely to engage in any kind of mobility, regardless of distance [14]. Additionally, households with school-age children tend to move distances that are approximately 7 % shorter compared to households without children [15].

In many countries, larger relocation distances are characteristic of more educated migrants, who can look for employment in the wider labour market and have greater spatial flexibility underpinned by their earlier experience of migration for study or career advancement [16; 17].

Although motivated by different drivers and forming different migration flows, students and pensioners move longer distances to concrete destinations: university towns and areas perceived to offer a better quality of life respectively [10; 18].

In the middle age group, migration distances may be shorter than in the younger cohorts. The mobility of 'older seniors' (aged 75 and older), which is often caused by tragic events, the inability to carry out farming, or the loss of a business, is mostly short-distance [19]. However, there is little consensus regarding migration in middle and senior age groups. For example, John Hipp and Adam Boessen [15] posit a U-shaped relationship between age and distance: households move the largest distances when the youngest and the oldest. The truing point is at the age of 37, suggesting that households headed by 37-year-olds migrate over the shortest distances.

Overall, it seems that certain migration distances correspond to certain stages of one's life, and the distance curve closely resembles the graph of the migration age profile [20].

Although there are numerous comparative studies of the migration behaviour of men and women [11; 21; 22 and others], including recent works by Russian scholars [23; 24], few conclusions have been made about the effect of sex on the distance of migration. Ravenstien believed that women migrated more often than men [1, p. 199], but over shorter differences [25, p. 288]. Over a century later, Thomas Niedomysl and Urban Franson [7] showed that women have a greater propensity for migration, yet they are less likely to move long distances than men [7]. On the other hand, women are responsible for interregional migration in Estonia, which, by implication, points to that women are mobile in terms of longer distance migration in the small-area country [26, p. 330].

Some works link migration distance to ethnicity [14; 17] and property ownership. It has been demonstrated for the US that estate owners move longer distances (by 75 %) than renters, albeit this difference is visible only as long as

short-distance is concerned and disappears for distances over 50 km [15]. A study into the situation in the Czech Republic [27] demonstrates that an increase in the proportion of estate owners causes the significance of long-distance migration to diminish, as estate owners seem to be particularly attached to their places of residence.

The concrete values of migration distance are affected by the size of the country, its geographical diversity, population density, settlements system (particularly, the distance between its main cores) and stage of urbanisation. In the Czech Republic, almost 50 % of migrations are within the range of 20 km; 70 % within 50 km. Overall, the situation in the country is described by the classical curve graph: migration intensity decreases as distance grows. Yet, the curve has a minor peak corresponding to the distance between Prague and Brno, which is about 210 km [27]. In the 1980s, 73 % in the US and 83 % in the UK moved within 50 km. But the average distance of migration in the former was thrice that in the latter [28]. The distances tend to reduce in countries with a high population density [29].

Direct inter-country comparisons of distances travelled by migrants are not entirely correct due to objective spatial and social differences, as well as the usage of national methodologies for measuring distances.

For instance, the calculations of migration distances in the US made at the same time but using different data and methods (by computing area centroids or based on migrants' accounts) yielded different results [28]. When employing the so-called areal methods based on population-weighted centroids and the areas of administrative units, the size and number of selected units become crucial factors [30]. In Sweden, migration distance reaches 80 km at the level of parishes (there are 1785 such units in the country); 141 km, municipalities (290); 297, NUTS-2 regions (8); 380 km, NUTS-1 (3) [7]. The dependence between the number of units and migrants is non-linear: a reduction in the number of administrative units does not entail a proportion decrease in the number of migrants.

To our knowledge, there are neither Soviet nor Russian studies into the connection between migration distance and motives as, until recently, the data required for understanding such dependencies were unavailable. At the national level, we have come across three works [31—33] looking at migration distances in Russia. All three use data on migration flows without considering any other information about migrants. This works aims to analyse how the distance of migrations carried out in Russia in the 2010s was affected by migrants' sex, age and type of resident registration. The article contributes to our understanding of the migration behaviour observed in Russia during the study decade. Its findings have implications as internal migration account for a significant share of all relocations and greatly affects the spatial pattern of settlement.

Methods and data

The data were used on 2011—2020 internal migrations in Russia, more precisely on resident registrations — permanent or temporary for at least nine months.

This long period includes the COVID-stricken year of 2020, which was marked by a slight reduction in the number of domestic migrations, primarily in the second quarter. Probably, short-term changes that occurred within one year did not have a significant effect on the calculated values since the analysis covered a much longer period. Moreover, there is no reason to believe that COVID affected migration distances as the statistics do not show considerable changes in migration destinations in 2020.

The work used de-identified data on migration with places of origin and destination indicate for each instance. The calculations and analysis factored out 'automatic returns', i.e. the expiration of temporary resident registrations counted by Rosstat as migration movements. Thus, the study focused on primary registration data. Rosstat assumes that after the expiration of temporary resident registration people return to the place where they have permanent registration rather than leaving for a different location. Over the study period, there were 8.1 million 'automatic returns', which are included in 38.9 of all domestic migrations recorded by Rosstat [34].

It seems unreasonable to take into account 'automatic returns' when analysing migration distance as they essentially double the number of relocations involving temporary resident registration in the total quantity of registered migration, whilst having no specific direction and being indistinguishable in terms of distance.

Movements between all Russian settlements, i.e. 2,300 cities and towns, and about 153,200 villages (however, according to the 2020 census, 24,800 of the latter were unpopulated). Using the geographical coordinates of each settlement, the Euclidean distance, which is the shortest distance between two points taking into account the earth's curvature, was calculated in kilometres for each instance of migration. Before that, 3,800 pairs of distances between Russian settlements were computed experimentally. The settlements were selected so that they represented actual migration movements in the country: intramunicipal, intraregional and interregional. Euclidean distances were calculated along with the lengths of transport routes (roads or, for poorly accessible areas, air routes). Euclidean distances were found to be 1.3—1.5 times shorter than the lengths of actual transport routes followed by migrants. This factor remains the same for all the territories, regardless of whether short- or long-distance migrations are considered. Therefore, it can be assumed that Euclidean distances present an accurate picture of migration distances.

Euclidean distances were used to compute the distance of migration: the total distance of all migration movements was weighted by the total number of migrations. The distance of migrations by Russian citizens was calculated in a similar manner according to age, sex and type of registration.

Permanent resident registration does not expire. Usually, one obtains it after purchasing real estate or moving in with relatives. In this respect, it is a near analogue of 'property owners' migration, a notion used in international studies. Temporary registration valid for from nine months to five years (sometimes longer), which is classified by Rosstat as long-term migration, is often obtained when moving into rented accommodation or halls of residence. Russian statistics consider migrants with both types of registration as long-term migrants and include them in the net migration rate.

Out of 30.8 million migrations recorded in 2011—2020, 'automatic returns' excluded, 11.1 million or 36 % were accompanied by temporary resident registration. The largest proportion of temporary resident registrations, 79.3 % of all cases, was accounted for by 15—22-year-olds, with a peak at the age of 18 (Fig. 1). People of this age are the most active migrants, often relocating for study purposes. Most study migrants obtain a temporary resident registration.
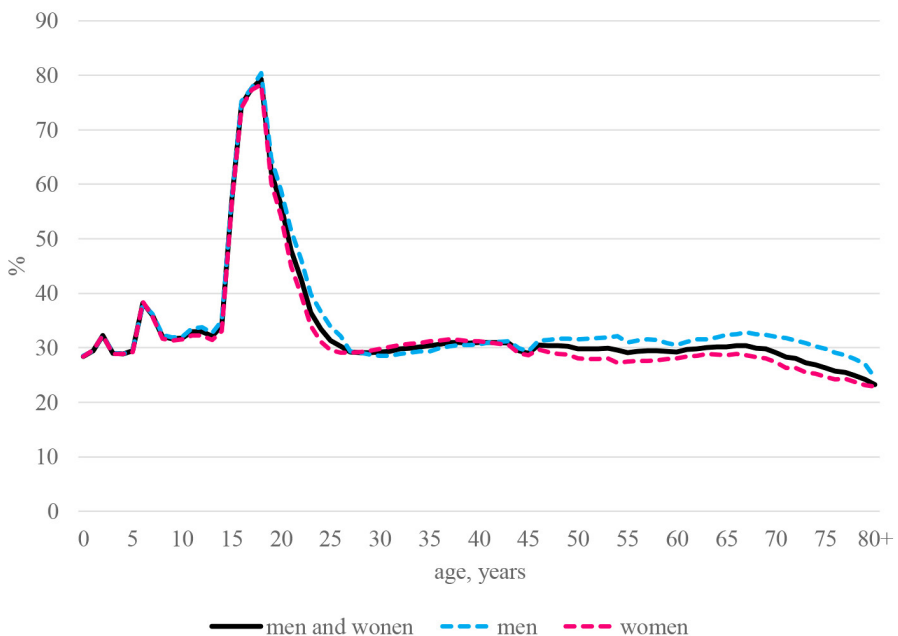
Fig. 1. Percentage of people with temporary resident registrations
by one-year and sex groups, 2011—2020

Calculated by the authors using unpublished Rosstat data.

In the other age groups, migrants with temporary registrations comprise about 30 %, with a minor peak at 6—7 years, probably explained by the need to register children before they start school.

The sex difference in the proportion of migrants obtaining temporary resident registrations is insignificant in Russia, as shown in Figure 1. We expected that, between ages 25 and 45, the proportion of women with a temporary resident registration certificate would be higher. According to our field observations, temporary resident registration certificates are often issued to women with children about to start school or kindergarten. Statistics show that, on the contrary, men obtain temporary registration slightly more often than women.

Results

According to the calculations, 43.5 % of all domestic migrations are within the range of 100 km (Table 1, Fig. 2). Almost a third of migrants move 50 km or less, i. e., a distance that can be covered by a commuter, for example, in the Moscow agglomeration [35]. Russia is a very large country, where, as Andrei Treivish demonstrated [36, p. 252], the average distance between major cities is from 45 to 75 km even in the relatively densely populated European part (compared with 10—20 km in the centre of Europe). But most migrants travel rather short distances nevertheless. Relocation frequency rapidly declines with distance. Putting concrete figures aside, one may conclude that the frequency-distance curves obtained for Russia are similar to those characteristic of Sweden [7], the Czech Republic [27], and Hungary [37].

Table 1

Migration distribution in Russia by distance, 2011—2020

Distance, km	Number of movements, million people			% of all relocations		
	Total migration	Permanent resident registration	Temporary resident registration	Total migration	Permanent resident registration	Temporary resident registration
Less than 10	2.4	2.0	0.4	7.7	10.2	3.2
from 10 to 50	7.3	5.5	1.8	23.6	27.6	16.4
From 50 to 100	3.8	2.5	1.3	12.3	12.3	12.2
From 100 to 200	4.0	2.4	1.6	13.1	12.4	14.2
From 200 to 500	4.1	2.3	1.8	13.4	11.8	16.3
From 500 to 1000	3.0	1.6	1.4	9.8	8.3	12.5

The end of Table 1

Distance, km	Number of movements, million people			% of all relocations		
	Total migration	Permanent resident registration	Temporary resident registration	Total migration	Permanent resident registration	Temporary resident registration
From 1,000 to 5,000	5.5	3.0	2.5	18.0	15.3	22.7
Over 5,000	0.7	0.4	0.3	2.2	2.1	2.5
Total	30.8	19.7	11.1	100.0	100.0	100.0

Calculated by the authors using unpublished Rosstat data.
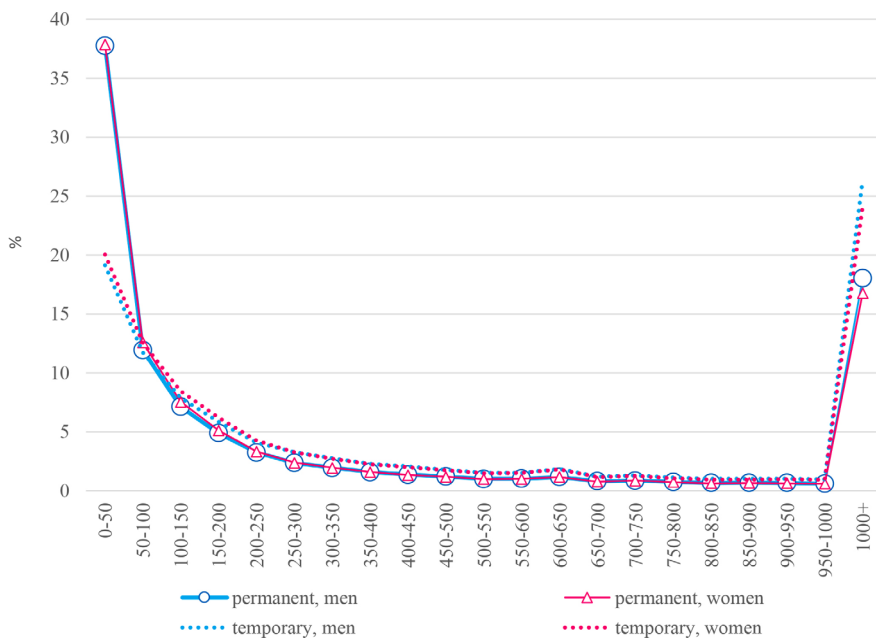
Fig. 2. Migration distribution in Russia by distance, 2011—2020, %

Calculated by the authors using unpublished Rosstat data.

A distance of 200—300 km, which separates Moscow from regional capitals bordering on the Moscow region or Krasnodar from Rostov-on-Don, is travelled by 6.3 % of Russia's internal migrants.

A distance of 1,000 km is covered by slightly above 20 % of migrants. It is comparable to the way from Moscow and Ufa, from Nizhny Novgorod to Ekaterinburg, and from Ekaterinburg to Novosibirsk. In the vast expanses of the eastern part of the country, a distance of 1000 km seems insignificant. Yet, it is travelled only by every fifth migrant. To compare, in Hungary, each fifth moves more than 100 km [37].

Temporary resident migration is obtained more often by migrants moving longer distances than those issued permanent resident certificates. Probably, obtaining registration when moving a short distance is virtually meaningless: no one will wonder about the registration of a resident of a neighbouring municipality or district. A resident of the Moscow region can live at a relative's place in Moscow without registration and not violate the law, and vice versa. Registration certificates are issued at halls of residence. But a person living 10 km away from the place of work or study would not need it, unlike the one living 100 km away and farther.

Probably, relocations within the range of 50 km, particularly those followed by obtaining permanent registration, fall into the category of residential mobility or are closely linked to it. Some of them involve moving from cities to suburbs or dachas (with registration obtained), which are becoming year-round homes and essential components of modern Russian residential mobility. These migrations, short-distance by Russian standards, are accompanied by little change: movers retain their employment; their children may still go to the same school or, less often, kindergarten; the family continues to use the services of the same public institutions. According to an earlier study [38], 62 % of respondent's families residing in the Moscow region have at least one family member working or studying in Moscow. The logic behind such relocation is very close to that behind commuting and is slightly at odds with the idea put forward in [39, p. 617], i.e., that a mover turns into a migrant after covering a distance 'set at the point at which commuting to work becomes so time-consuming and expensive as to require the substitution of a change of residence'.

Moreover, such migration satisfies the traditional idea linking movements to certain stages in life: at 30 families are expected to move from cities to suburbs looking for more spacious accommodation and a children-friendly environment [40; 41]. Children under 14 are the most frequent movers in the range of 10—50 km (Table 2), but since they do not relocate on their own, the data on this group mark the movements of parents with children.

Table 2

Distribution of movements at selected ages by distance, 2011—2020, total migration, %

Distance, km	Age, years							
	0—14	15—19	Including		20—24	25—49	50—64	65 and older
			16	18				
< 10	9.9	3.4	3.7	2.2	5.0	8.0	9.2	8.3
From 10 to 50	29.8	19.0	28.0	13.2	17.5	23.2	24.7	25.4

The end of Table 2

Distance, km	Age, years							
	0—14	15—19	Including		20—24	25—49	50—64	65 and older
			16	18				
From 200 to 500	11.5	16.5	12.2	19.7	16.1	13.4	11.4	12.8
From 500 to 1000	8.2	9.0	5.7	10.9	11.1	10.5	9.3	9.1
From 1000 to 5000	14.5	14.0	9.2	15.9	20.3	19.0	21.6	17.0
Over 5000	1.8	1.4	1.1	1.4	2.2	2.3	3.2	2.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Calculated by the authors using unpublished Rosstat data.

People of school-leaving age also move short but not the shortest distances. At the age of 16, relocations over 20—40 km are common, this distance loosely corresponding to the catchment areas of vocational schools in district centres. Parents rarely agree to let children of this age move farther for study, believing its necessary to retain parental control and embracing the 'weekdays at school, weekends at home' system.[1] The range of 20—40 km includes distances between the centres of villages within a municipality and is also associated with intramunicipal migration.

At 18, after leaving school, people are more likely than the population of any other age group to move distances corresponding to those between the own 'periphery' and regional capitals, i.e., 100—200 km, which is also consistent with the catchment area of regional universities.

Longer distances are usually travelled by people starting or finishing their careers, i.e., at the ages of 20—24 and 50—64. They are more likely to move distances over 1000 km than any other age group. Probably, a major factor in these movements is that the migrants either do not yet have a family in the former case or do not have underage children any more in the latter. Long-distance migration may also be linked to leaving Russia's North after having worked there long

[1] Let us quote an excerpt from an expert interview conducted in the town of Borisoglebsk, the Voronozh district, during a HSE expedition to the Voronezh and Samara regions: 'Few people leave Borisoglebks after the ninth school year as the town has its own vocational school, and the middle-school graduates are too young for the parents to let them go. Yet, migration at this age is large-scale in local villages and other districts. Living 'at a babushka's' (renting a room in a flat) is more expensive than staying at a hall of residence, but still very popular. Parents often try to settle their middle-school graduate kids 'at a babushka's' to make sure that they know their schedule, do not oversleep or play truant' (https://foi.hse.ru/openrussia/migration-boris).

enough for 'northern' retirement, which is five years earlier than in the other parts of the country. In most cases, this is relocation from regions with extreme natural conditions where migration has become inextricably linked to 'northern' retirement [42]. Amongst pensioners, the share of long-distance movements decreases and short-distance grows.

The average distance of all migrations is 654 km; for those permanent resident registration, 581 km; and temporary resident registration, 789 km. These figures are significantly lower than those obtained in 1966 (1,457 km for the urban population of the RSFSR [32]) and in the 1990s—2000s: 2130 km in 1989, 2,345 km in 1994, and 1937 km in 2002 [33]. However, today's calculations are incomparable to previous ones due to several reasons:

— the calculations in this article, unlike the earlier ones, take into account intraregional migration, which, by definition, is associated with shorter distances but makes a considerable contribution to total national migration, being thus capable of affecting the balance;

— the calculation methodology has changed (in this study, Euclidean distances are computed for all towns and villages, without aggregation, whilst earlier contributions employed the so-called 'areal' method for calculating migration distance for aggregated units and selected modes of transport [for more detail, see corresponding articles]).

Using an adjustment coefficient to make a transition from Euclidean distances taking into account the earth's curvature to actual route lengths makes the obtained figures reach 850—915 km for all relocations, bringing them closer (but not making them equal) to earlier results.

The average migration distance travelled by different age group points to dissimilarities in the 'logic' of migration depending on sex, age and type of resident registration (Fig. 2). The migration distance curves tend to have two peaks: one at 22—23 years old and the other, albeit less pronounced, at 50—70. Reductions in migration distance are observed at the ages of 0, 6, and 15—19 years (as long as temporary resident registration is considered).

The reason behind the short-distance migration of children aged 0 (or more precisely, of families with infants) is much less obvious. Probably, the short-distance movement can be explained by residential mobility, as families often seek new accommodation once they have welcomed a new member. This could be a contributing factor to the observed trend. When children reach the age of six, parents have an incentive to register them at the rented accommodation so that applying to a nearby school becomes possible; some other families move closer to a selected school.

The sharp decline in relocation distance after finishing secondary school (nine years) is a sign of student migration. Moving to study at vocational schools usually involved shorter distances than moving to study at university after having finished high school (11 years).

The migration distance peak at the age of university graduation and first career steps is mostly associated with male migrants. It is the age at which sex differences in migration distance are the most pronounced (Fig. 3).
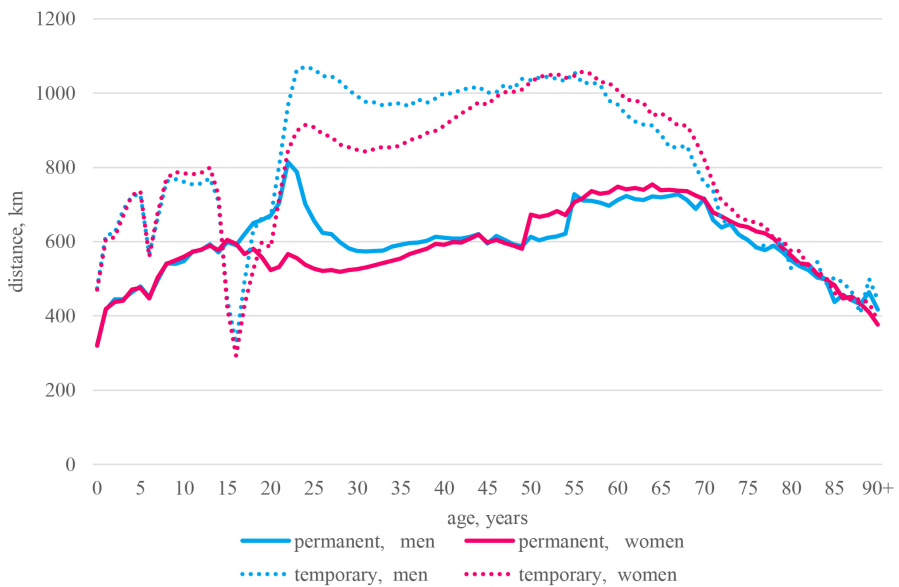
Fig. 3. Average migration distance for different ages and sex, 2011—2020, km

Calculated by the authors using unpublished Rosstat data.

The distance peak for migrants obtaining permanent resident registration is accounted for by men, whilst there is no difference as long as temporary resident registration is examined (Fig. 4). Higher average migration distance values for men are observed until the age of 40—45, after which the figures become similar. This difference may be due to men marrying later and thus staying 'free' to move greater differences or being incarcerated at penitentiary institutions.[1] The assumption that such migrants are mostly single is supported by the fact that people aged 25—40 travel over longer distances than children aged 0—14. Since children do not migrate on their own, the age group of 25—40-year-olds can be divided into those with children, moving short distances, and singles moving longer ones.

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[1] This involves registration and is recorded by Rosstat as instances of migration.
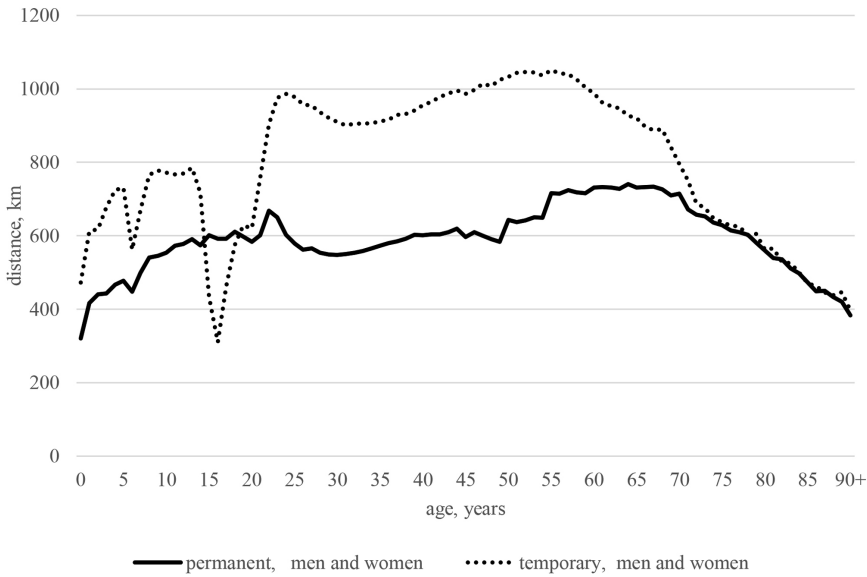
Fig. 4. Average migration distance in different age groups,
according to resident registration type, 2011—2020, km

Calculated by the authors using unpublished Rosstat data.

Longer migration distances associated with pre- and early retirement ages are in general conformity with the 'empty nest' effect [43] and the exodus from the North, which makes a substantial contribution to total migration at these ages [44]. The figures remain relatively high until the age of 75, after which they decrease to low values. Apparently, 'older seniors' are not actively involved in long-distance migration; in most cases, they move closer to the family once they can no longer look after themselves.

For all age groups, except for students and seniors, there is a connection between longer average migration distances and temporary resident registration. This link might be due to migrants not being required to obtain resident registration when moving shorter distances. Another possible explanation is the cases resembling residential mobility.

Conclusions and discussion

The above distance of migration analysis leads to important conclusions about the essence of human migration that go beyond considerations concerning the number of kilometres covered when moving. Migration distances were calculat-

ed for 30.8 million intra- and interregional movements undertaken by Russians within the country in 2010—2010 between about 130,000 points in space.[1] The massive scale of calculations prompted us to compute migration distances using Euclidean distances (the shortest between two points but taking into account the earth's curvature), which proved practical. If our focus were on the contribution of different modes of transport to migration or the share of the population for whom relocation becomes technically impossible due to the absence of transport links or poor spatial cohesion, we would have concentrated on calculating the precise length parameters of transport routes. Our goals, however, were different. We sought to understand the general proportion of the population moving different distances and whether migration distances differ between demographic groups.

The calculations show that 31.3 % of relocations are associated with very short distances, not more than 50 km. These are movements between neighbouring villages belonging to different municipalities, between cities and their suburbs, i. e., between territories, the distance between which can be associated with migration and commuting alike.

The data obtained through observations and field studies have provided empirical evidence that individuals tend to travel relatively short distances when they enter vocational school. The distance of migration to university is classified as medium-length. Yet, very few 16- and 18-year-olds move distances shorter than 10 km. Individuals in these age groups are typically not involved in extremely short migrations. Instead, they tend to cover more substantial distances, such as moving to a different city or region, which may be motivated by factors such as attending university or gaining residency in a specific area, such as living in a hall of residence and obtaining corresponding resident registration.

The obtained estimate of the average distance of migration in Russia at 654 km, which seems quite modest in comparison to the country's vast area, would be much longer if actual transport routes had been measured. If, wherever possible, the calculations were of the lengths of roads, the adjusted average distance would reach 850—915 km.

The migration distance analysis and calculations for selected ages confirmed our assumption about the effect of an individual's age on migration destinations and provided a clearer picture of the phenomenon:

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[1] According to the 2020 national census, Russia has 155,599 villages and towns, 24,700 of them unpopulated (Itogi VPN-2020, Tom 1 Chislennost' i razmeshchenie naseleniya, tabl. 3 [2020 Census Results, Volume 1 Population size and distribution, Table 3]).

— relocations after finishing secondary or high school, albeit both instances of study migration, have different logic and goals behind them. The network of vocational schools is more dispersed, with its institutions usually located in municipal centres, than that of universities, which tend to concentrate in regional centres and thus are less accessible [45]. Therefore, despite both forms of mobility involving relocation to the nearest large settlement, their destinations differ in their position in the urban hierarchy, and migrants who have finished secondary school (9 years) tend to travel shorter distances.

— in Russia, migration at pre- or early retirement age often means travelling longer distances, for instance, from the northern territories to regions with a milder climate or as return migration across the country;

— unlike the migration of 'younger seniors', the reduction in migration distances at older ages is very similar to that observed internationally and is explained by moving in with the family and receiving necessary care [44];

— at the age of starting a family, people usually move short distances, for example, to suburbs. Earlier, this conclusion was drawn for Moscow and the Moscow region [46].

Migrants obtaining temporary resident registration travel longer distances than those issued permanent resident registration. This means that the change in statistical methods for measuring migration, which took place in 2011, not only resulted in an increase in total migration (from 2 to 4 million internal migrants) but also altered its statistical visibility. Since 2011, the statistics have been capable of discerning a significant number of long-distance movements. Our calculations basically confirmed the conclusion made by Olga Chudinovskikh [47] who emphasised the catastrophic scale of unrecorded student migration, which was the case until 2011. About 80 % of student migrants, who obtained temporary registration, remained below the radar of statistics. In the other age groups, about 30 % of relocations weren't taken into account, most of them long-distance, as is now apparent. Changes in the statistical methods for measuring long-term migration made it possible to solve most of the completeness problems of the 2010s (albeit new issues, such as 'automatic return' have arisen). This circumstance increases the significance of our findings.

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COMPARATIVE ANALYSIS OF THE TERRITORIAL SUPPORT FRAME OF SETTLEMENT IN COASTAL AREAS: THE CASE OF ST. PETERSBURG AND KALININGRAD REGIONS

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As a scientific method, comparative studies respond to the needs of society. However, the logic of globalisation has reduced the demand for comparative analysis in international and national (regional) studies. Nevertheless, old, settled coastal areas — which European urban science considers as evidence of the decisive effect of coastal position on spatial development and urbanisation — remain valid research objects. Achieving corresponding theoretical and practical goals requires qualitative and quantitative analysis of urbanisation in coastal areas. This article aims to determine whether the territorial support frameworks of settlement in the St. Petersburg and Kaliningrad regions meet the modern conditions of settlement system development. A cartographic modelling of the settlement structures of the two Russian regions was carried out using Golden Software Surfer 20. The models obtained were supplemented with isolines reflecting the fields of the spatial structure of urban settlement. The settlement systems were analysed from the standpoint of transport communications, using the Engel and Goltz coefficients. The coefficient values show that road transport is the most developed in the study regions, while river transport is the least developed. It is concluded that spatial development is leading to urbanisation and reinforcing the monocentric model of spatial structure. However, the economic effects of monocentricity are almost exhausted, and the limits of polarisation and effective growth attainable with the model are nearly reached. This calls for a transition to a polycentric urbanisation model through developing local centres and enhancing transport connectivity between them. It seems that, in the new economic and political conditions, Russia's two coastal border regions will benefit the most from the linear-nodal settlement. The study identified the local cores that can lay the foundation for the transition to the new settlement model.

Introduction and problem setting

Coastal regions have a critical role in the development of nations, regardless of whether it is considered in a socioeconomic or political context. According to Aleksandr Druzhinin, the "gravitation to the sea" phenomenon, which encompasses the economic and population trends, along with related institutional, economic, socio-cultural, and spatial planning factors and impacts, serves as the primary indicator and fundamental characteristic of coastal zones or regions [1, p. 28]. He writes that, in Russia, only 23 regions have an outlet to the sea, accounting for 60 % of the country's territory and 24.2 % of the population. Seventeen of these sites can be classified as 'encouraging coastalisation', meaning they have a strong presence of maritime industries and their most populated and economically developed centres are disproportionately located in the coastal zone [1, p. 29]. In Russia, the regions of this kind include the coastal regions of the Baltic Sea: Russia's semi-exclave of the Kaliningrad region and the St. Petersburg metropolitan area comprising two administrative units, St. Petersburg and the Leningrad region. The role and significance of these territories in the current geopolitical situation, has markedly increased in the current geopolitical situation. Both territories, sharing a similar position in terms of physical, economic and political geography, have a distinctly coastal settlement system and a maritime economy. Although there are many geographical commonalities between the two areas and they both have attracted intense interest from the research community, this is the first study to conduct a comparative analysis of the territorial support frames of settlement characteristic of the St. Petersburg metropolitan area and the Kaliningrad region.

The article *aims* to quantify the correspondence between the territorial support frames of settlement in the two regions and the current conditions of settlement system development.

To this end, the following *objectives* are attained:

— to examine theoretical approaches to the core-periphery analysis of cities and describe the role of coastal regions;

— to carry out a comparative analysis of the established elements of territorial support frames of settlement in the St. Petersburg metropolitan agglomeration and the Kaliningrad region;

— to analyse the settlement systems in the study regions from the perspective of transport communications.

Theoretical framework

Modern approaches to urbanisation are anchored in the recognition of the special role of cities. This is where economics not only does not contradict but strongly agrees with political science and sociological theories. An interdisci-

plinary approach presupposes a geographical component, the extent of whose influence becomes particularly apparent in the coastal zones specializing in maritime industries. This happens because the urban core controls the vast bulk of interactions among local resource holders, i. e., a share that by far exceeds its own. It is capable of dominating the area in economic and economic geographical terms [2].

Regional development of complex coastal and capital regions, which is often constrained by some ancillary factors, has been considered within agglomeration studies [3—5] and works focusing on agglomeration-based metropolitan areas [6]. Some observations on American agglomerations prove the effect of a coastal position [7; 8].

For a long time, international academic science saw the theory as a 'growth machine'. This interpretation was based on the belief that the highest level of a city's socioeconomic development is reached through extensive exploitation of its economic, demographic, and spatial potential [9]. The Soviet cities of Leningrad (today, St. Petersburg) and Kaliningrad followed this model as well. The strength of this approach is that it linked the process of agglomeration as linked to globalisation and the development of international trade. These approaches were employed by Paul Krugman [10]. Yet, his new economic geography, which won him a Nobel Prize, has at its core economic effects produced without continuous extensive spatial growth.

The tenets of new economic geography may be considered the theoretical framework of this study. Current approaches subsumed under this concept draw on the thesis about the principal role of cooperation, neighbourhood effects, spillover events and economic growth spreading from cities to adjacent territories. This assumption holds true for not only large cities but also neighbouring countries and states. For example, periphery regions may experience agglomeration effects in large cities only if the country is involved in international economic integration.

The key problems of modern settlement systems in urbanised districts are well-known: growing cities devour landscapes, literally spreading over hundreds of square miles in all directions [see 11]. Although natural limitations do exist, there is some debate in the literature whether it is possible 'to prod an agglomeration whose growth is not restricted by the sea or mountains into a better, desired direction' [12, p. 19]. Further questions that require investigation include how this can be achieved without turning the entire area into a continuous urban sprawl and how spillover effects can be initiated. The answer, which is particularly important for coastal regions, is broader participation in global trade. For instance, Carl Gaigné and Jacques-François Thisse write that the 'main contribution' of new economic geography was the idea that '[u]nder constant returns, firms find it profitable to disperse their production to bring it

closer to customers, as this will reduce transport costs without lowering productive efficiency. Such a space economy is the quintessence of self-sufficiency: if the distribution of factor endowments is uniform, the economy reduces to a Robinson Crusoe-type economy where each person produces for his or her own consumption. Under these circumstances, only differences in endowments of immobile production factors can explain the marked differences in the spatial distribution of activities, and hence the need for interregional and international trade [13]. The Russian scholars Svetlana Rastvortseva and Lyudmila Snitko arrive at a similar conclusion: 'agglomeration effects help regions save their assets and, having a specialisation, distribute them more effectively' [14, p. 46]. In other words, no matter what consideration we are motivated by, abandoning agglomeration effects is neither possible nor prudent.

Let us consider in this context some fundamental elements of the European experience of urbanisation. It is worth noting that the process of agglomeration took place in European coastal regions in a very similar manner [15].

A natural result of the development of society, coastal urban agglomerations are associated with certain economic consequences. An economist sees the city as a tool to increase the competitiveness of the economy, a mechanism ensuring an inflow of resources for the development of the whole settlement system. Moreover, it is traditionally perceived as the site where conditions emerge for social development at an entirely new level [16]. An efficiently organised network of cities, towns and settlements comprising an agglomeration can generate economic profits that would not be made otherwise. Yet, the periphery is losing economic and demographic opportunities, and these losses cannot be compensated for within either a command or market economy.

The concept of periphery first appeared in the international literature on economics and economic geography in the mid-20th century. A classic of the core-periphery concept is John Friedmann. His model holds that uneven economic growth and spatial polarisation inevitably lead to disproportions between the core and the periphery. Throughout the lifespan of the core-periphery system, the core continuously dominates over the periphery, which is particularly conspicuous in the areas influenced by large agglomerations [17].

The city is a symbol of global and regional socio-political inequality. The primary factor behind the appearance of global cities is the skewed distribution of resources between the global core and the periphery [18], which translates into inequality between states and cities. This type of inequality has been extensively investigated by international researchers [19—24]. In Russia, it has been explored by Olga Gritsai, Grigory Ioffe and Andrey Treyvish [25], Natalya Zubarevich [26], Oleg Golubchikov and Alla Makhrova [27], Tatyana Nefedova and Andrey Treyvish[28], Inna Manaeva [29] and others.

In the case of Russia, inequality means that some processes develop there asynchronously with Western and even Eastern Europe, albeit their general direction in Europe and Russia coincide. This also holds for coastal agglomerations underpinning settlement systems, for instance, those of St. Petersburg and Kaliningrad.

The spatial configuration of coastal regions extends beyond their "marine façade," as these territories are characterized by vibrant economic activity, a concentration of towns, and population growth through migration. The development of such towns and cities would be impossible without exploiting the advantages of coastal agglomerations. A product of similar combinations of factors, these advantages have similar results when it comes to the economic effects of spatial planning structures manifested in the territorial support frame of settlement (TSFS) [30—32]. The TSFS is the location and combination of its elements — settlements (nodes) and transport links (lines) — and the interaction between them. Each TSFS has a main city, which is the core that performs the function of political administration, concentrates people, industries, and resources. Additionally, there are linear elements comprising thoroughfares, with roads and railways being the most important ones. As Pavel Polyan wrote in 1988, 'economic and social development is increasingly displaying tendencies of gravitation towards areas and lines. These tendencies manifest themselves in population agglomeration and the emergence of multimodal routes, i.e., processes converging at the level of the support frame of settlement' [33, p. 37—38].

Coastal regions in general and the St. Petersburg metropolitan area and the Kaliningrad region in particular have been studied extensively by human geographers and regional economists. For instance, the sustainable development of coastal regions has been examined by Aleksandr Druzhinin [1; 34], Pytor Baklanov [35], Göran Roos, Natalya Kubina and Yulia Farafonova [36]. Gennady Fedorov and Valentin Korneevets [37].

The St. Petersburg metropolitan area has been placed in the context of the 'coastal factor' in several studies by Stanislav Lachininsky and colleagues [38—40]. The effect of coastal position on the Kaliningrad region has been addressed by Gennady Fedorov, Tatyana Kuznetsova and Vladimir Razumovsky [41], as well as Ivan Gumenyuk, Lidiya Gumenyuk and Nikolai Belov [42].

Selected aspects of the territorial support frame of the St. Petersburg metropolitan agglomeration and urban agglomerations have been investigated by Viktor Solodilov [43; 44] and Leonid Losin [44], Marina Sviridenko [45], Stanislav Lachininsky and Ivan Sorokin [46], Mikhail Kalmykov [47] and other. Ivan Gumenyuk, Veronika Yustratova [48] and Anna Belova have looked at the features of settlement in the Kaliningrad region [49].

Materials and methods

This study uses statistics from Petrostat, the St. Petersburg and Leningrad regional branch of the Federal State Statistics Service (FSSS), and Kaliningradstat, the Kaliningrad regional branch of the agency.[1] Particularly, it looks at data on the total population from 2005 to 2022 as of January 2 of the corresponding years, the number of settlements and size of urban population as of 1 January 2022, the length of federal, regional and municipal public roads,[2] the length of public railways[3] and the length of inland waterways.[4] The information was retrieved from the FSSS website.

The Yandex.Maps service was used when examining the established TSFS in the study regions; the analytical, statistical and geostructural methods were employed in the study, along with cartographic modelling.

The cartographic modelling of the TSFS structures in the St. Petersburg metropolitan agglomeration and the Kaliningrad region was carried out using Golden Software Surfer 20. Particularly, the software was used to digitalise city coordinates and the outlines of the study regions. Based on the obtained absolute population size for towns as of 1 January 2022, cartographic models were constructed, incorporating isolines to delineate the spatial structure of urban settlement fields.

Results

The St. Petersburg metropolitan area is Russia's third largest region, after Moscow and the Moscow region. As of 1 January 2022, 7,289,100 people lived there, and the area's population density reached 84.8 people/km². The city of St. Petersburg is home to 5,377,500 people (73.8 %), and the Leningrad region has a population of 1,911,600 (26.2 %), with a population density of 3,737 people/km² and 22.6 people/km² respectively. With a population of 1,027,800 people, the Kaliningrad region has the 50th largest area in the country and a population density of 68.1 people/km². The residents of the city of Kaliningrad

[1] Kaliningrad region in numbers. 2009. A book of statistics. Kaliningradstat. Kaliningrad, 2009; Kaliningrad region in numbers. 2022. A summary of statistics. Kaliningradstat. Kaliningrad, 2022.

[2] Length and characteristics of public roads (since 2006), 2022, *Rosstat,* URL: https://rosstat.gov.ru/search?q=Протяженность+автомобильных+дорог+общего+пользования+по+субъектам+Российской+Федерации&date_from=&content=on&date_to=&search_by=all&sort=relevance (accessed 15.10.2022).

[3] Length and density of public railways (since 2000), 2022, *Rosstat,* URL: https://rosstat.gov.ru/search?q=протяженность+Железнодорожных+путей+общего+пользования&date_from=&content=on&date_to=&search_by=all&sort=relevance (accessed 15.10.2022).

[4] Transport in Russia 2020, 2022, *Rosstat,* URL: https://rosstat.gov.ru/search?q=протяженность+судоходных+путей&date_from=&content=on&date_to=&search_by=all&sort=relevance (accessed 15.10.2022).

account for 48.5 % of the region's population with 498,300 people, while the rest of the territory accounts for 51.5 % with 529,400 people. The population density in the city is 2,317.5 people/km², while in the rest of the territory it is 35.6 people/km².

In the past 17 years, the population of the two regions has been increasing. In the St. Petersburg metropolitan area, the 2022 population growth rate reached 12.9 %, compared with 2005; in the Kaliningrad region, 9.1 %.

Moreover, the two regions differ substantially in the number of towns and urban-type settlements (UTSs): 70 (34 towns and 36 UTSs) over the 85,939 km² of the St. Petersburg metropolitan area and 23 (22 and 1 respectively) over the 15,100 km² of the Kaliningrad region. Figures 1 and 2 show the fields of the spatial structure of urban settlement in the St. Petersburg metropolitan area and the Kaliningrad region, based on the absolute population size values.
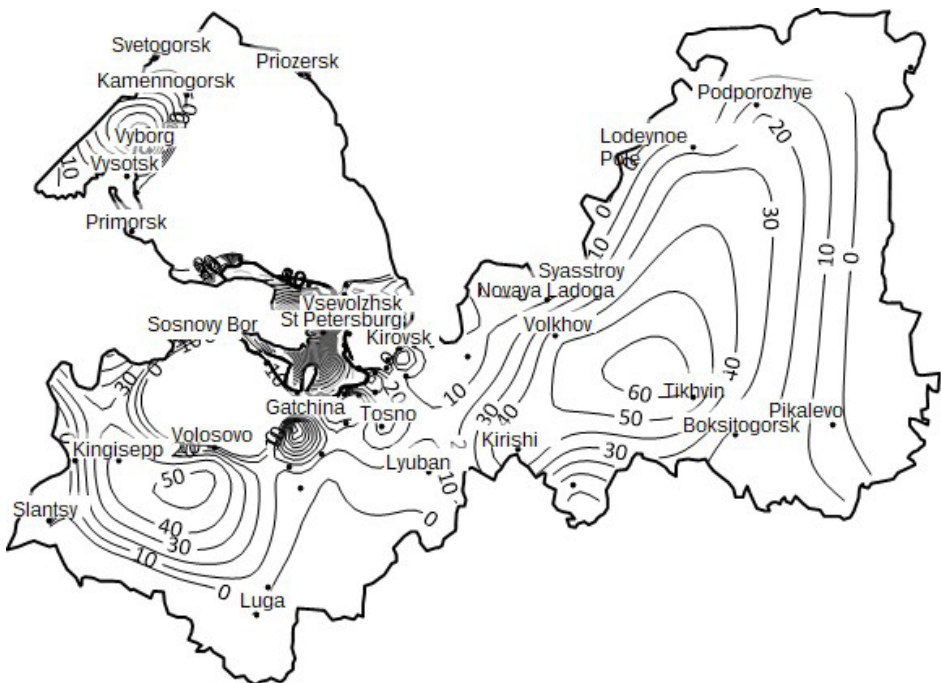
Fig. 1. Fields of the spatial structure of urban settlement
in the St. Petersburg metropolitan area

Source: prepared by the authors based on Petrostat data[1].

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[1] St. Petersburg 2021. A summary of statistics. Petrostat. St. Petersburg, 2022; Permanent population of Leningrad region municiaplities as of 1 January 2002, *Petrostat,* URL: https://petrostat.gks.ru/storage/mediabank/%D0%A7%D0%B8%D1%81%D0%BB.%D0%9B%D0%9E%20%D0%BD%D0%B0%2001.01.2022.pdf (accessed 15.10.2022).
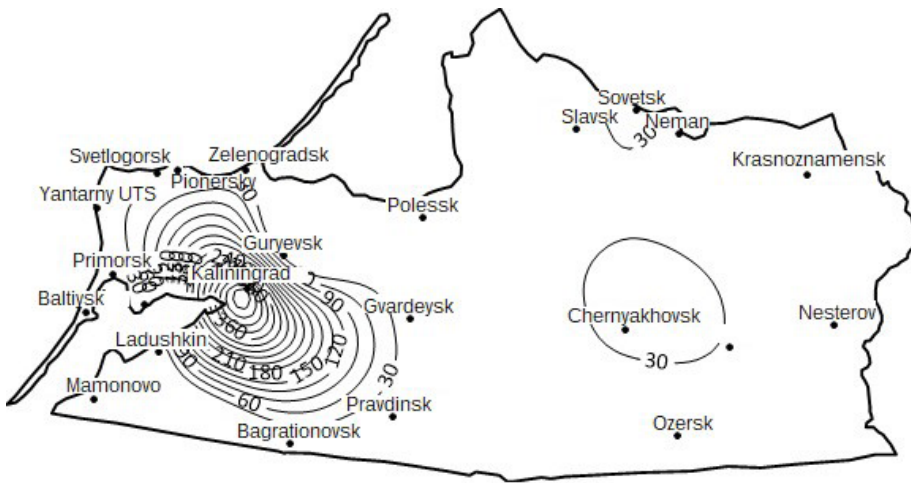
Fig. 2. Fields of the spatial structure of urban settlement in the Kaliningrad region

Source: prepared by the authors based on Federal State Statistics Service data on the Kaliningrad region[1].

As Figs. 1 and 2 show, the study regions exhibit a monocentric, concentric model of the spatial settlement structure, which grew around their respective administrative-political and socio-economic cores — St. Petersburg and Kaliningrad. The transport systems of the regions are also oriented to these two cities. Yet, St. Petersburg is more monocentric than Kaliningrad. St. Petersburg has a population 60 times as large as that of the region's second most populated town, Gatchina, whilst Kaliningrad's population is only 13 that of its satellite town of Sovetsk.

The two regions also have local cores, which attract people from nearby areas. In the St. Petersburg metropolitan area, these are Vyborg, Gatchina, Kingisepp, Tosno and Tikhvin; in the Kaliningrad region, Sovetsk and Cherenyakhovsk. These cores are of local significance due to their administrative status, which is true of Gatchina and Tosno, and the distance to the main cores (Vyborg, Kingisepp, Tikhvin, Sovetsk, Chernyakhovsk). Nevertheless, all of them are situated in the same 'coastal' space behind the 'marine façade'.

The St. Petersburg metropolitan area has the following planning axes of the territorial support frame, which are linked together by roads:

— northwestern, passing from Vyborg;

— northern, from Priozersk;

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[1] Kaliningrad region in numbers. 2022. A summary of statistics. Kaliningradstat. Kaliningrad, 2022.

— northeastern, from Kirovsk. Volkhov, Lodeynoe Pole, Podporozheyv (a railway axis);

— southeastern, from Tikhvin;

— southern, from Tosno;

— southwestern, from Gatchina and Luga;

— western, from Kingisepp and Ivangorod;

— St. Petersburg Southern half-ring A-120 (motorway).

The planning axes of the territorial support frame of the Kaliningrad regions are as follows:

— Kaliningrad — Mamonovo;

— Kaliningrad — Chernyakhovsk;

— the ring road connecting the resort towns.

The spatial structures of the St. Petersburg metropolitan agglomeration and the Kaliningrad region have large coastal belts: the coastal belt proper and the land-coast belt. The configuration of the coastal shorelines in the two regions and their settlement structure allows for the identification of coastal zones within the coastal belts. In the St. Petersburg metropolitan area, the coastal belt consists of three distinct coastal zones:

1. The northwestern zone stretching along the central part of the Karelian Isthmus from Svetogorsk in the north to Kamennogorsk to the administrative border of St. Petersburg in the Sertolovo district in the south. The zone includes six towns (Vyborg, Sertolovo, Svetogorsk, Kamennogorsk, Primorsk, Vysotsk) and three urban-type settlements (Roshchino, Sovetsky and Lesogrosky), their urban population totalling 184,700 people.

2. The central zone comprising the main core of St. Petersburg within its administrative borders and the adjacent settlements of the Leningrad region: ten towns (Murino, Vsevolozhsk, Kudrovo, Gatchina, Otradnoe, Nikolskoe, Kommunar, Tosno, Kirovsk and Shlisselburg) and sixteen urban-type settlements (Yanino-1, Kuzmolovskiy, Novoselye, Sverdlova settlement, Toksovo, Villozi, Taitsy, Fedorovskoe, Rakhya, Krasnyi Bor, Dubrovka, Pavlovo, Ulyanovka, Fornosovo, Morozova settlement and Bolshaya Izhora). Its total population is 5,926,200 people with St. Petersburg accounting for 90.7 % or 5,377,500 people. The northernmost point of this zone is the Sertolovo district (the town itself is not part of it). Then, it goes southeastward, reaching the shore of Lake Ladoga via Toksovo, Rakhya, and Morozov settlement, Shlisselburg. Having passed Kirovsk, it coincides with route A-120. The zone also includes Tosno, which is 13 km away from the route, and finally reaches the southern coast of the Gulf of Finland at the village of Bolshaya Izhora.

3. The southwestern zone, whose eastern border runs along most of route A-120, from the village of Bolshaya Izhora in the north until the road crosses the Gatchina motorway in the south at the village of Voiskovitsy in the Gatchina district. From there it follows the Gatchina motorway westward via Volosovo and then route 41A-002 towards the adjoining road of A-180 'Narva' (including Kingisepp) and Narva. The zone includes four towns (Sosnovyi Bor, Volosovo, Kingisepp, Ivangorod) and one UTS (Lebyazhye), its urban population totalling 136,700 people.

The coastal belt of the Kaliningrad region has two zones:

1. The central zone, which skirts Kaliningrad, is composed of 13 towns (Kaliningrad, Baltiysk, Primorsk, Ladushkin, Mamonovo, Pionerskiy, Svetlyi, Svetlogorsk, Bagrationovsk, Gvardeisk, Guryevsk, Zelenogradsk and Pravdinsk) and one urban-type settlement UTS (Yantarny), with a population of 665,300 people. The city of Kaliningrad with 498,300 residents comprises 74.9 % of the zone's urban population. The zone stretches from Zelenogradsk in the north southeastward to Guryevsk to Gvardeysk, where it turns southwest, running via Pravdinsk to reach Bagrationovsk.

2. The northern zone, which borders on the west the central zone until it reaches Gvardeysk (albeit it does not include the town). Then the border turns east, following European route E-28 until it reaches the village of Talpaki where it turns northeast and runs along route A-216 to Sovetsk and Neman. The zone comprises four towns (Sovetsk, Neman, Polessk and Slavsk) with a total urban population of 60,100 people.

The coastal belt of the St. Petersburg metropolitan agglomeration includes three coastal zones, within which 21 towns and 21 UTSs are situated, whose total population is 6,247600 people or 93.9 % of the territory's urban population. The Kaliningrad coastal bet has two coastal zones with 17 towns and 1 UTS, their urban population totalling 725,400 people or 90.8 % of the total population of the region's towns.

The other territories of the St. Petersburg metropolitan agglomeration and the Kaliningrad region are part of the land-coast belt.

Let us determine the level of development of linear TSFS elements, i.e., the transport links, by calculating the Engel and Goltz coefficients. The Engel coefficient is computed according to the formula:

$$d = \frac{\mathrm{L}}{\sqrt{SN}} \, , \tag{1}$$

where L is the total length of routes, km; S is the total area of the region, km²; P is the population, 1,000 people.

The Goltz coefficient is calculated as follows:

$$d = \frac{\mathrm{L}}{\sqrt{SP}} \, , \tag{2}$$

where N is the number of settlements.

The difference between the two coefficients is that the former includes the total population and the latter the number of settlements. Thus, their values can differ dramatically. The Goltz coefficient provides a more accurate picture of transport development since the same route may link settlements with incommensurable populations.

The table shows the values of statistical indicators, as well as of the Engel and Goltz coefficients, for the principal modes of transport: road, rail and river.

The calculation of the Engel and Goltz coefficients demonstrates that, in the two study regions, the highest values are associated with road transport and the lowest with river communications. The transport (linear) elements of the TSFS seem to be more developed in the Kaliningrad region than in the St. Petersburg metropolitan area. This conclusion holds for all the transport modes, except for railway, and only as long as the Goltz coefficient is considered. The Engel coefficient indicates that the Kaliningrad region is 2.17 times more developed than the St. Petersburg metropolitan area in terms of road transport, 1.42 times in railway transport, and 1.77 times in river transport. On the other hand, according to the Goltz coefficient, the Kaliningrad region is 1.42 times more developed than the St. Petersburg metropolitan area in road transport and 1.16 times more developed in river transport. However, the St. Petersburg metropolitan area has 1.08 times more developed railway transport compared to the Kaliningrad region.

The transport networks of the Leningrad and Kaliningrad regions may be conducive in overcoming monocentricity, which might be expected in the case of long-settled areas. Moreover, the transport-geographical factors hint at the possibility of a common methodology for the development of settlement systems in the Leningrad and Kaliningrad regions.

Statistical indicator, the Engel and Goltz coefficients for road, rail and river transport in the St. Petersburg metropolitan area and the Kaliningrad region

Region	Total road/railway/waterway length, km			Area, km²	Number of towns and UTSs	Population, 1,000 people	Coefficient					
	Public roads	Public railways	Inland waterways				Road transport		Railway transport		River transport	
							Engel	Goltz	Engel	Goltz	Engel	Goltz
St. Petersburg metropolitan area	26741.219	2981.3	1907.7	85300	70*	7289.1	1.07	10.94	0.12	1.22	0.08	0.78
Kaliningrad region	9173.5	667.6	534	15100	23	1027.8	2.33	15.57	0.17	1.13	0.13	0.91

Source: calculated by the authors based on data from the Federal State Statistics Service[1].

Comment: * expect for the settlements comprising the administrative region of St. Petersburg.

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[1] Length and characteristics of public roads (since 2006), 2022, *Rosstat*, URL: https://rosstat.gov.ru/search?q=Протяженность+автомобильных+дорог+общего+пользования+по+субъектам+Российской+Федерации&date_from=&content=on&date_to=&search_by=all&sort=relevance (accessed 15.10.2022) ; Length and denity of public railways (since 2000), 2022, *Rosstat*, URL: https://rosstat.gov.ru/search?q=протяженность+Железнодорожных+путей+общего+пользования&date_from=&content=on&date_to=&search_by=all&sort=relevance (accessed 15.10.2022) ; Transport in Russia 2020, 2022, *Rosstat*, URL: https://rosstat.gov.ru/search?q=протяженность+судоходных+путей&date_from=&content=on&date_to=&search_by=all&sort=relevance (accessed 15.10.2022).

Conclusions

The above analysis of the settlement systems of the St. Petersburg metropolitan agglomeration and the Kaliningrad region points to a high degree of similarity, which is due to both geographical and historical factors. Yet, the two systems are not identical. The spatial limitation of the 'marine façade' is present in the regions. Their main polarised cores, St. Petersburg and Kaliningrad, while being economically successful and enjoying a population growth, exert a 'coercive' effect on the nearby areas and contribute to the development of corresponding planning structures, i. e., the territorial support frames of settlement. Therefore, this study drew on two popular concepts: the core-periphery model and new economic geography.

A comparative spatial analysis of the structural elements of the territorial support frames of settlement showed that both regions have an established monocentric model of concentric type, monocentricity being particularly pronounced in St. Petersburg. The study also identified the local cores that attract population in the territories and described the directions of the planning axes of the territorial support frames. In the St. Petersburg metropolitan area, the local cores are Vyborg, Gatchina, Kingisepp, Tosno and Tikhvin; in the Kaliningrad region, Sovetsk and Chernyakhovsk. The former has seven planning axes; the latter, three.

The spatial structures of the two regions include large coastal belts: a coastal belt proper and a land-coast belt. Coastal belts are composed of coastal zones: three in the St. Petersburg metropolitan area (northwestern, central and southwestern) and two in the Kaliningrad region (central and northern).

The Engel and Goltz coefficients were computed to define the level of development of the linear elements, i. e., transport routes. The calculation showed that road transport outstrips other modes in both regions, whilst river transport is the least advanced. The Kaliningrad region performs better than the St. Petersburg metropolitan area across all modes of transport with the exception of railway transport as assessed based on the Goltz coefficient.

Therefore, the similar socioeconomic conditions observed in the country, the Baltic area, and the world cause the two regions to develop in the same direction, compensating for some tendencies of recent years. In the years to come, the maritime component will not play the same decisive role. Consequently, spatial planning carried out in the study regions should embrace the transition from a monocentric to polycentric spatial structure model, a transition bolstered by the emergence and development of local satellites and their linear relationships (a linear-nodal model). Given the current values, growing monocentricity will no longer produce positive economic effects, such as those associated with agglomeration. On the contrary, it will have mounting negative consequences.

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POPULATION CHANGE AND THE SETTLEMENT SYSTEM TRANSFORMATION IN POLAND, AS REVEALED BY THE 2021 CENSUS

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This article aims to analyse current geodemographic changes in Poland, based on the data of the 2021 National Population and Housing Census. Methods, traditional for socioeconomic geography, such as zoning, were employed. Poland's population decreased during the inter-census period (2011—2021), with the urban population declining faster than its rural counterpart. The large voivodeships aligned along the Vistula 'axis'— Mazowiecka, Lesser Poland and Pomerania— outperform other Polish regions in geodemographic terms. The situation is relatively favourable in Greater Poland, where the country's main motorways converge. Districts and voivodeships where the geodemographic situation is more vulnerable can be divided into two groups: depressed and backward. The first one includes the traditionally industrial voivodeships of Southern and Central Poland; the second mainly consists of eastern voivodeships. The population decline in Eastern Poland is gathering pace: the 2021 census shows, a more or less favourable geodemographic situation is observed only in the main eastern cities and their environs. This state of affairs is largely due to the Polish government deliberately halting cooperation with Russia and Belarus, including cross-border collaborations. Yet, this decision seems to create more problems for Poland than its eastern neighbours. If the current trends persist, the eastern voivodeships, the stronghold of the right-wing conservatives in power, may not only rapidly lose population but also face a reduction in the level of socioeconomic development.

Keywords:
Poland, census, population, settlement system, voivodeships

Introduction

In the second and the beginning of the third decade of the 21ˢᵗ century, the population structure in Europe underwent significant changes. Many countries experienced a combination of positive net migration and natural population decline. The positive net migration was influenced by both legal and illegal migration from Asian and African countries, while the natural decline was primarily attributed to the ageing population in most European countries.

Although these geodemographic transformation trends were general for Europe, there were significant variations across its different regions, including Northern, Western, Southern, and Eastern Europe, as well as across individual states and regions within them. The geodemographic changes in the post-socialist countries of Eastern Europe appear particularly interesting. In the 30 years since the demise of the USSR and the 'socialist camp' led by it, the paths of the former 'states of real socialism' have diverged widely. Many of the processes that we have witnessed and are witnessing now in the former socialist countries are also taking place in the states that emerged on the former territory of the Soviet Union, including Russia.

The demographic processes in Poland require special attention. The country is the largest post-socialist state in Eastern Europe in terms of area and population, and it has a long common border with the post-Soviet countries of Russia, Lithuania, Belarus and Ukraine. Moreover, there are clear similarities in the political transformation of the Republic of Poland and the Russian Federation. Since the PiS party (Pol. "Prawo i Sprawiedliwość", Eng. "Law and Justice") came to power, Poland has aligned its foreign and domestic policy with the values that are traditionally important to Polish society, as perceived and interpreted by the leaders of the Law and Justice (PiS) party. The foreign policy approach of the PiS is rooted in the belief that Poland is surrounded by adversaries, with Russia being the primary concern. Similarly, Russian foreign policy is shaped by the perception that the country is encircled by enemies, with NATO being identified as its largest adversary, and Poland's membership in the alliance playing a significant role in this context. In the domestic policies of both countries, Poland and Russia, there are notable similarities. In Poland, there is a strong emphasis on demographic policy, often referred to as 'political demography', which prioritizes family values rooted in religious foundations. Similarly, in Russia, there is a focus on addressing demographic challenges through government initiatives aimed at increasing fertility rates. Both countries perceive government investment and support for family and fertility as key approaches tackling their demographic issues. Poland has the 500+ policy [3], while Russia has its maternity (family) capital policy. At the same time, birth rate stimulation in Poland also has a repressive component. They limit abortion penalizing providers,[1] which is not yet the case in Russia.

The demographic processes in Russia and Poland are also similar. Both countries see a decrease in population, mainly due to its natural decline. Although for several years after joining the European Union, Poland experienced a peri-

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[1] Projekt Godek trafi do Sejmu. Zbiórka podpisów zakończona, 2022, *Rzeczpospolita,* URL: https://www.rp.pl/polityka/art37654631-projekt-godek-trafi-do-sejmu-zbiorka-podpisow-zakonczona?fbclid=IwAR1pT9eN3gi8OtozKn6QrX_YL5UJQjX0ZdtZx2uG-ccLt2BTEQTWDDvQp5Ow (accessed 14.02.2023).

od of growth in the birth rate, defined as a "euro-baby boom" [4], this quickly passed. In addition, being an EU member, Poland experiences a large outflow of labour [5].

The National Population and Housing Census (Narodowy Spis Powszechny Ludności i Mieszkań, hereinafter referred to as NSP 2021) was held in Poland between April 1st and September 30th 2021. In contrast to Russia, in Poland, participation in the census is mandatory, residents must give accurate, comprehensive and relevant answers to the census questions. Providing incorrect information can result in a fine or imprisonment for up to two years, refusal to provide the information required for the census is punishable by a fine, a fine is also imposed for failure to comply with the deadlines for providing the information (paragraph 1, Art. 28, as well as Art. 56—58 of Act on Official Statistics).[1] NSP 2021 data were collected online, through phone interviews with either a citizen calling a special line or census takers (pol. — rachmistrzów spisowych) calling a citizen, as well as through face-to-face interviews conducted by enumerators visiting people's homes. Thus, the NSP 2021 data appear to be complete and reliable, allowing for an objective assessment of the current geodemographic processes in Poland.

Statistics Poland (Główny Urząd Statystyczny, hereinafter referred to as GUS) published preliminary census results from February to December 2022. At the time of writing this article (early 2023), the latest report was the one released on December 21st, 2022. Called "Ludność rezydująca — informacja o wynikach Narodowego Spisu Powszechnego Ludności i Mieszkań 2021" ("Permanent population — information on the results of the National Population and Housing Census 2021"), it was the first one providing finalised census results.[2]

This article aims to analyse current geodemographic changes in Poland, based on the data of the 2021 National Population and Housing Census.

Materials and Methods

The main method employed in the research is statistical. The principal data source is the NSP 2021 reports published by GUS in 2022. The study also uses descriptive, classification and zoning methods conventional for economic and geographical research.

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[1] Ustawa z dnia 29 czerwca 1995 r. o statystyce publicznej. Poz. 459, 2022, *Dziennik Ustaw Rzeczypospolitej Polskiej. Warszawa,* URL: https://sip.lex.pl/akty-prawne/dzu-dziennik-ustaw/statystyka-publiczna-16796947 (accessed 14.02.2023).

[2] Ludność rezydująca — informacja o wynikach Narodowego Spisu Powszechnego Ludności i Mieszkań, 2022, *Warszawa: Główny Urząd Statystyczny*, URL: https://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc/ludnosc-rezydujaca-dane-nsp-2021,44,1.html (accessed 14.02.2023).

Results

The main result of any population census is the identification of the major trends in population change. In general, in the inter-census period (2011—2021), Poland's present population decreased. As of March 31st, 2021, it was 37,019,327 people, or 97.2 % of the population in 2011 (38,044,565 people[1]), which slightly differs from the current Eurostat data (Fig. 1).
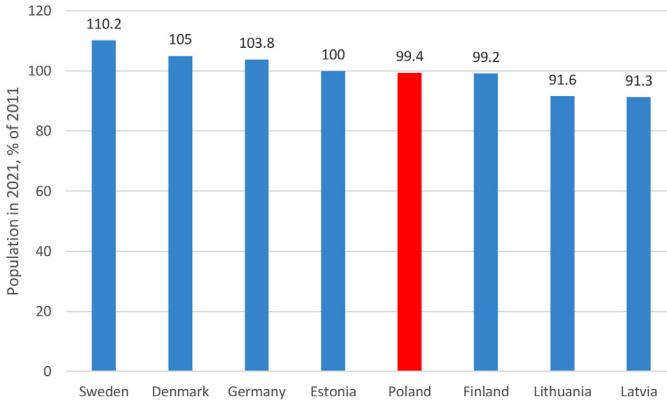
Fig. 1. Changes in the population of EU countries in the Baltic macroregion, percentage of 2021 to 2011 population

Compiled from: Population change — Demographic balance and crude rates at the national level, 2022, *Eurostat,* URL: https://ec.europa.eu/eurostat/databrowser/view/demo_gind/default/table?lang=en (accessed 14.02.2022).

The number of men (17.9 million in 2021, 18.4 million in 2011) and women (19.1 million in 2021, 19.6 million in 2011) both decreased by approximately 0.5 million (the approximation is the result of the rounding). Thus, we can assume that the main reason for the decrease in Poland's population between 2011 and 2021 was its natural decline (Table 1).

Table 1

**Demographic changes in Poland between 2011 and 2021,
people per 1,000 population**

Year	Migration gain	Birthrate	Mortality	Natural increase	Total gain
2011	− 0.3	10.2	9.9	− 0.3	0
2021	0.1	8.8	13.8	− 5	− 4.9

Compiled from: Population change — Demographic balance and crude rates at the national level, 2022, *Eurostat,* URL: https://ec.europa.eu/eurostat/databrowser/view/demo_gind/default/table?lang=en (accessed 14.02.2022).

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[1] Ludność rezydująca — informacja o wynikach Narodowego Spisu Powszechnego Ludności i Mieszkań, 2022, *Warszawa: Główny Urząd Statystyczny*, URL: https://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc/ludnosc-rezydujaca-dane-nsp-2021,44,1.html (accessed 14.02.2023).

If negative net migration had had a major part in population decline, the number of representatives of one sex would have decreased faster than the other. These processes predominantly involve men, although in today's post-industrial countries of "United Europe," it is challenging to determine whether male or female occupations are in higher demand. The same applies to labour immigration to Poland, mostly from the East, mainly Ukraine, predominantly its Western part [6] (Table 2).

Table 2

Elements of demographic changes in the EU countries in the Baltic macroregion, people per 1,000 inhabitants

Country	Migration gain	Birthrate	Mortality	Natural increase	Total gain
2021					
Germany	3.6	9.6	12.3	− 2.7	1
Poland	0.1	8.8	13.8	− 5	− 4.9
Sweden	4.9	11	8.8	2.2	7
Denmark	4.6	10.8	9.8	1	5.7
Finland	4.1	9	10.4	− 1.4	2.6
Lithuania	12.4	8.3	17	− 8.7	3.7
Latvia	− 0.2	9.2	18.4	− 9.2	− 9.3
Estonia	5.3	10	14	− 4	1.3
2011					
Germany	3.7	8.3	10.6	− 2.3	1.3
Poland	− 0.3	10.2	9.9	− 0.3	0
Sweden	4.8	11.8	9.5	2.3	7.1
Denmark	2.4	10.6	9.4	1.2	3.6
Finland	3.1	11.1	9.4	1.7	4.8
Lithuania	− 12.6	10	13.6	− 3.6	− 16.2
Latvia	− 9.7	9.1	13.9	4.8	− 14.5
Estonia	− 2.9	11.1	11.5	− 0.4	− 3.3

Compiled from: Population change — Demographic balance and crude rates at the national level, 2022, *Eurostat,* URL: https://ec.europa.eu/eurostat/databrowser/view/demo_gind/default/table?lang=en (accessed 14.02.2022).

Between 2011 and 2021, the proportion of the urban to rural population was changing with a slight increase in the share of the latter. Poland's urban population was 23.1 million people, comprising 60.8 % of its total population, in 2011, it decreased to 22.2 million people in 2021, 59.9 % of the total population. The rural population was 14.9 million people in 2011 (39.2 % of the total), and 14.8 million people in 2021 (40.1 % of the total). Thus, with the total population falling by about 1 million people between 2011 and 2021, Poland's urban population decreased by about 900,000, and the rural population by 100,000 people.

Identifying the causes and consequences of ruralization is a challenging task, especially considering that it is relatively uncommon in European countries. However, Poland has experienced a decline in its urban population since the end of the 20th century [7]. While urbanization has been a characteristic trend in most European states for centuries, Poland has lagged behind many of them in terms of its level and pace, largely maintaining its identity as a predominantly rural country. Similar to Russia, a significant portion of the urban population in Poland consists of individuals who are first- or second-generation city dwellers and may not be fully accustomed to urban lifestyles.

In Poland, the challenges of urban lifestyle development can be attributed, in part, to the historical process of the country's territorial formation during and after World War II. The country lost a large part of the Second Polish Republic (interwar Poland), while it obtained some new lands in the north and west (the so-called Recovered Territories, Pol. Ziemie Odzyskane), where a large share of the population was displaced both from the central regions severely damaged during the war and from the former eastern outskirts of the Second Polish Republic, which became part of the USSR (to the Ukrainian SSR and the BSSR). This displaced population settled primarily in the cities. According to Zhirov, "the incorporation of highly urbanized Western lands into the Polish state significantly increased the general level of the country's urbanization. Peasants, the majority of the migrants, had to adjust to city life" [9, p. 85]. The path for the rehabilitation of rural areas in the north and west of present-day Poland was creating large agricultural enterprises on vast tracts of land [10] mainly relying on urban settlements abandoned by Germans. Those who have worked and continue to work in these enterprises have been and remain agricultural workers rather than peasants dominating eastern Poland. An integral part of ruralization in the country is suburbanization, with new urban quarters built outside cities in formally rural areas. We can call it "false ruralization" by analogy with "false urbanization".

Another probable reason for the decline in the number and proportion of the urban population is the increase in the number of homeless, former city dwellers leaving their permanent residence and moving "to nowhere". Homelessness is a big problem in Poland. However, it has become so commonplace, just like in Russia, that only its extreme cases get attention. For instance, in November 2022, wide media coverage was given to a story about a mother with a two-year-old daughter found living in a tent in the coastal forest belt near Gdansk.[1]

According to Fedorov, "the geodemographic characteristics of regions affect the direction and rate of their socioeconomic development, whereas the emerging disparities between the actual living standards and the desired course of regional development can aggravate existing economic and social problems" [11, p. 7]. Characterizing the territorial differentiation of the geodemographic development in the Baltic region, Kuznetsova and Fedorov correctly state that "in

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[1] Ewa Palińska. Kobieta z dwuletnią córką w namiocie na mrozie, 2022, *Trojmiasto. pl. Fakty i opinie,* URL: https://www.trojmiasto.pl/wiadomosci/Bezdomna-kobieta-z-dwuletnia-corka-w-namiocie-na-mrozie-n172861.html (accessed 14.02.2023).

highly developed regions demographic indicators are better" [12, p. 136]. The reverse is also true: the better the region's demographic indicators, the healthier its economic and social development is. Comparing changes in the voivodeships' population against their gross regional product per capita confirm this assumption [13].

Spatial differences in the geodemographic development of Poland are striking.

EU statistics distinguishes seven NUTS 1 regions in Poland: PL9 (Makroregion województwo mazowieckie (Masovian Voivodeship Macroregion) consisting of Warsaw Capital region and Masovian Region), PL6 (Makroregion północny (Northern Macroregion) with Kuyavian-Pomeranian, Warmian—Masurian, Pomeranian Voivodeships), PL5 (Makroregion południowo-zachodni (South-Western Macroregion) with Lower Silesian and Opole Voivodeships), PL4 (Makroregion północno- zachodni (North-Western Macroregion) with Greater Poland, West Pomeranian and Lubusz Voivodeships), PL8 (Makroregion wschodni (Eatern Macroregion) with Lublin, Podlaskie, Subcarpathian Voivodeships), PL2 (Makroregion południowy (Southern Macroregion) with Lesser Poland and Silesian voivodeships), PL7 (Makroregion centralny (Central Macroregion) with Lodz and Holy Cross Voivodeships).

The territories within the NUTS 1 regions of Poland display notable demographic, social, and economic diversity. It seems that in some cases, the composition of these units was divided mechanically by the EU statistics service, without fully accounting for the unique characteristics and dynamics of the country's territory. For example, the Warmian-Masurian Voivodeship geodemographically (and in other ways) has much more in common with the Podlaskie Voivodeship (its principal city is Bialystok) than with the Pomeranian Voivodeship (Gdansk) even though it shares a common history with the latter (before World War II this territory was part of Germany). Indeed, besides their geographical proximity to the eastern border of Poland, the Podlaskie and Subcarpathian voivodeships in the PL8 "Makroregion wschodni" exhibit notable differences in various aspects. These differences encompass nature, demography, and economy, among other factors. The natural environment, including landscapes, climate, and ecological features, can vary significantly between the two regions. Additionally, demographic characteristics such as population size, composition, and migration patterns can differ substantially. Two voivodeships on the shore of the Baltic Sea, the Pomeranian and the West Pomeranian, belong to different NUTS1 regions, the Northern and the North-Western, respectively. The name "centralny" (Central) seems somewhat inappropriate for a macroregion consisting of the Lodz (its principal city is Lodz) and the Holy Cross (Kielce) voivodeships since neither of them is in any sense "central". Lodz, once a developed textile centre, is an old industrial city in deep decline. Kielce is just a backward city that never knew much prosperity.

Considering geodemographic, natural, transport and other factors and using the basin principle of zoning, the authors distinguish other regions than those in

the NUTS grid. They can be called geodemographic areas: Capital (Masovian Voivodeship with the middle reaches of the river Vistula as the axis), Coastal (Pomeranian and West Pomeranian voivodeships with the Baltic Sea coast as the axis), Warta (Greater Poland and Lubusz voivodeships with the river Warta running into the Oder in its middle reaches as the axis), Silesian (Lower Silesian, Opole, Silesian voivodeships with the Oder in its upper reaches as the axes), Precarpathian (Lesser Poland, Holy Cross and Subcarpathian voivodeships with the upper reaches of the Vistula and its tributary the San as the axis), Bug-Masurian (Lublin, Podlaskie and Warmian-Masurian voivodeship, the axis in its southern part is the Bug, in its western part there is a watershed between the basins of the Vistula and the Neman and the Pregol, which is the Masurian lakes), and Vistula-Oder (Kuyavian-Pomeranian and Lodz voivodeships with the watershed between the Vistula and the Oder, and the lower reaches of the Vistula) (Table 3).

Table 3

Population changes in the geodemographic areas, 2011—2021

Geodemographic area	Population, thousand people		2021, % of 2011
	2011	2021	
Capital	5,286	5,513	104
Coastal	4,007	4,009	100
Warta	4,478	4,486	100
Silesian	8,557	8,242	96
Precarpathian	6,754	6,704	99
Bug-Masurian	4,826	4,562	95
Vistula-Oder	4,632	4,413	95

Compiled from: Ludność rezydująca — informacja o wynikach Narodowego Spisu Powszechnego Ludności i Mieszkań, 2022, *Warszawa: Główny Urząd Statystyczny*, URL: https://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc/ludnosc-rezydujaca-dane-nsp-2021,44,1.html (accessed 14.02.2023).

During the inter-census period, it is noteworthy that only one geodemographic area, specifically the Capital area (also referred to as NUTS 1 PL9 Makroregion województwo mazowieckie), experienced a population increase among the seven areas identified by the authors. However, this growth was mainly due to Warsaw. While in the capital the population grew by 10 %, in the rest of the voivodeship by 2 %, and this growth was in the suburbs of Warsaw. A significant part of the Masovian Voivodeship, mainly its northern and eastern counties (powiats) showed a decrease in population. In the Coastal and Warta regions in the north and northwest of Poland, the population remained approximately the same. In all the other geodemographic areas, the population has declined. The smallest decrease (by 1 %) was in the Precarpathian region (southeast of Poland). The population in the Silesian region in southwestern Poland decreased by 4 %. The biggest reduction (by 5 %) was reported in the Bug-Mazurian and Vistula-Oder regions located to the west and east of the Capital region.

In terms of the combination of demographic trends in the voivodeships and their principal cities, all the voivodeships can be divided into the following groups:

— voivodeships with the population increasing in both the voivodeships and their principal cities;

— voivodeships with the population declining in general but growing in their principal cities;

— voivodeships with the population growing in voivodeships in general and declining in their principal cities;

— voivodeships with the population declining both in the voivodeships and in their principal cities (Fig. 2).
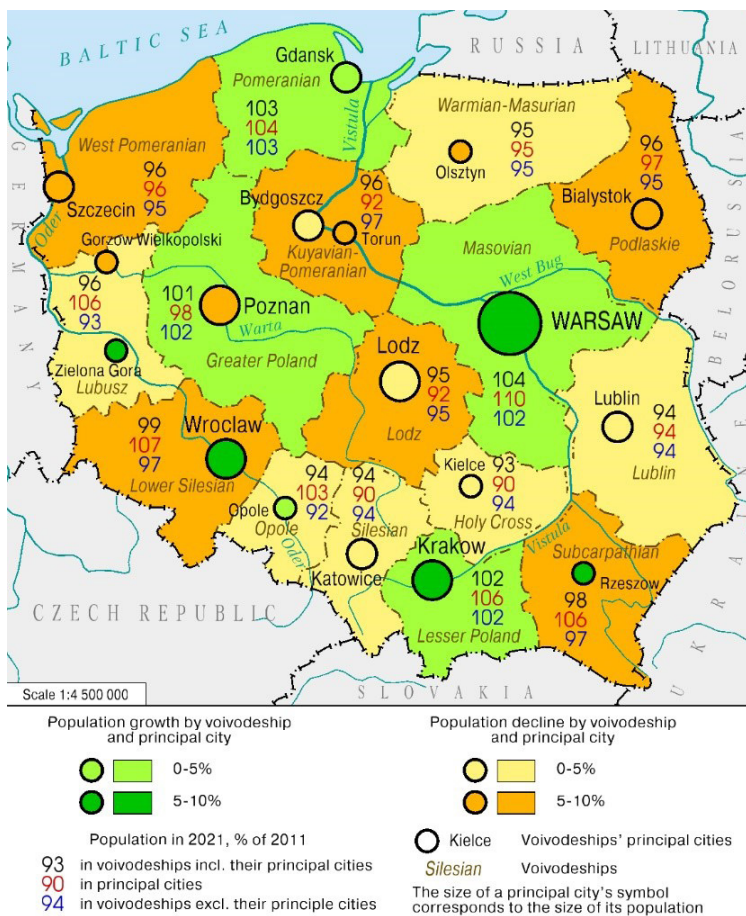

Fig. 2. Changes in resident population by voivodeships and their principal cities, 2011—2021

Compiled from: Ludność rezydująca — informacja o wynikach Narodowego Spisu Powszechnego Ludności i Mieszkań, 2022, *Warszawa: Główny Urząd Statystyczny,* URL: https://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc/ludnosc-rezydujaca-dane-nsp-2021,44,1.html (accessed 14.02.2023).

The population growth of some principal cities is due to the incorporation of the adjacent settlements. For instance, one of the two principal cities in the Lubusz voivodeship, reported a decrease in the population (in 2021 it was 96 % of its 2011 size), while the other, Zielona Gora, showed an increase (in 2021 it was 116 % of its 2011 size). The demographic trends in both the Lubusz Voivodeship in general and in these cities would have been the same, but on January 1st, 2015, Zielona Gora incorporated a suburban rural gmina with the same name, which technically increased its population. The expansion of the urban area contributed to the growth of the population of Krakow (in 2013, it incorporated part of the gmina Kocmyrzow-Luborzyca) and Opole (in 2017, it incorporated parts of the gmina Dabrowa, Dobrzen Wielki, Komprachcice and Pruszkow). The territory of Rzeszow expanded three times in that period: it incorporated part of the gmina Swilcza in 2017, part of the gmina Glogow Malopolski and Tyczyn in 2019, part of the gmina Glogow Malopolski in 2021). Due to the expansion of the urban area, the population decline rate in Szczecin has formally decreased, since in 2017 it incorporated the gmina Goleniow[1].

As mentioned earlier, the Masovian Voivodeship and its principal city, Warsaw, are among the regions and cities in Poland experiencing population growth. In the north of Poland, it is the Pomeranian Voivodeship with Gdansk as its principal city. In the inter-census period, its total population grew by 3 %, and the population of Gdansk by 4 %. The basis of the settlement system of the Pomeranian Voivodeship is Tri-City (Pol. Trójmiasto). It is three practically merged cities: the port of Gdansk (formerly German Danzig), the port-industrial Gdynia, built in the interwar period as the only then Polish port on the Baltic Sea, and the resort Sopot, located between them [14]. The population in Tri-City is growing due to both positive net migration and natural growth [15].

In the south of Poland, one of the voivodeships where both the total and principal cities' populations grew, is the Lesser Poland Voivodeship (Krakow). Such voivodeships are the most prosperous not only from a geodemographic but also from a socio-economic perspective. The Masovian, Pomeranian, and Lesser Poland voivodeships, along with Greater Poland, have consistently been at the forefront in terms of quality of life for several decades [16] (Table 4).

Table 4

Differences in voivodeships' GRP per capita and population changes

Voivodeship	GRP per capita in 2021, % of Poland's average	Population in 2021, % of 2011
Masovian	158.6	104
Lower Silesian	109.6	99
Greater Poland	108.6	101

[1] Ludność rezydująca — informacja o wynikach Narodowego Spisu Powszechnego Ludności i Mieszkań, 2022, *Warszawa: Główny Urząd Statystyczny*, URL: https://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc-rezydujaca-dane-nsp-2021,44,1.html (accessed 14.02.2023).

The end of Table 4

Voivodeship	GRP per capita in 2021, % of Poland's average	Population in 2021, % of 2011
Silesian	100.7	94
Lodz	97.2	95
Pomeranian	94.2	103
Lesser Poland	90	102
West Pomeranian	84.6	96
Kuyavian-Pomeranian	82.1	98
Lubusz	82	96
Opole	79.8	94
Podlaskie	74.1	96
Holy Cross	73.1	93
Warmian—Masurian	71.3	95
Subcarpathian	69.4	98
Lublin	69.2	94

Compiled from: Regions in Europe. 2022 interactive edition, 2022, *Eurostat,* URL: https://ec.europa.eu/eurostat/cache/digpub/regions/#total-population (accessed 14.02.2023).

The coefficient of linear correlation between the GRP per capita in 2021 and the population changes between 2011 and 2021 is 0.65, i.e. the relationship between them is close to significant.

It should be noted that it was in the geodemographically most prosperous voivodeships where the consequences of the COVID-19 pandemic were most pronounced [17]. In the same manner, Russian well-off regions suffered greater than the others from the pandemic consequences [18; 19]. However, the pandemic had not considerably changed the demographic situation either in Poland or Russia.

There are four voivodeships in Poland where the total population is decreasing while their principal cities' population is growing: Lubusz, Lower Silesia, Opole, and Subcarpathian. The first three are a vast area of land on the Oder. In the Lubusz Voivodeship, the increase in the population of its two principal cities, Zielona Gora, as noted above, is largely formal: the city's population grew due to the incorporation of suburban areas. The Lower Silesian Voivodeship (its principal city is Wroclaw) and the Opole Voivodeship (Opole), saw population redistribution.

Economically, the cities of Lower Silesia have a strong reliance on mining and primary processing industries. For example, the Legnica-Gloga copper district (pol. Legnicko-Głogowski Okręg Miedziowy, LGOM) occupies a significant part of the Lower Silesian Voivodeship which geographically largely coincides with the Legnica Voivodeship existing between 1975 and 1998. The then division into voivodeships, much more fractional than the current one, generally corresponded to Poland's economic and geographical zoning. The principal city of this area is Legnica, the command and a large garrison of the Soviet Northern Group of Forces were located from 1945 to 1993 [20]. A copper plant (Pol. Huta Miedzi

Legnica), built in 1951—1953 with the technical assistance of the USSR, was the second city-forming enterprise until 1993. Upon the withdrawal of Soviet (Russian) troops from Poland, it became the first one. This enterprise is quite successful, its production is growing, especially quickly after the 2019 ceremonial launch of a tilting rotary furnace for copper scrap by the current Prime Minister of Poland Mateusz Morawiecki.[1] At the same time, the shift to recycling and use of scrap has led to a decrease in the use of products of mines in the LGOM, and, as a result, to a decrease in jobs both there and in the copper plant due to the growth in productivity with the introduction of new equipment. Thus, the improving economic performance of the city-forming enterprise contributed to the deterioration of the demographic situation rather than its improvement. In 2011, the population of Legnica was 103,000 people, while in 2021, it was 94,000 people. The population of the Legnica-Glogow subregion (generally coinciding with the LGOM) of the Lower Silesian Voivodeship amounted to 454,000 in 2012, and 434,000 in 2021. This is not the evidence of Legnica "spreading" to its surrounding gminas and counties, but the evidence of the population outflow from the economically growing area.

In this case, Legnica serves as an example, but similar geodemographic changes can be observed in other cities and towns in the Lower Silesian and Opole voivodeships. It seems that a portion of the population leaving cities and towns similar to Legnica in Lower Silesia chooses to leave the region, and sometimes even Poland, while another portion settles in the principal cities of the voivodeships, contributing to their population growth.

In the Subcarpathian Voivodeship, the increase in the population of its principal city, Rzeszow, just like in Zielona Gora in the Lubusz Voivodeship, is largely formal and stems from the merging with its suburban areas. At the same time, Rzeszów is the first major Polish city on the path of Ukrainian labour migration to Poland, which also contributes to the growth of its population (migration from Ukraine related to the military events that began in February 2022 is not the subject of this article).

One of the voivodeships with the total population growing and the principal cities' population decreasing is the Greater Poland Voivodeship with its centre in Poznan. This geodemographic transformation results from the fact that the determining factor in the economic development of the modern Greater Poland Voivodeship is its economic and geographical position. Two of Poland's key motorways go through it: the latitudinal one connecting Western Europe with Belarus and Russia and the longitudinal one connecting the Polish ports on the Baltic Sea with the Czech Republic and the more southern states of the European Union. Such a favourable economic and geographical location has naturally attracted industries, and Poznan was not the only industrial centre of Greater Poland.

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[1] Andrzej Andrzejewski. Huta Miedzi "Legnica" uruchomiła nowy piec, *Radio Wroclaw, 28 czerwca 2019 r.,* URL: https://www.radiowroclaw.pl/articles/view/88084/Huta-Miedzi-Legnica-uruchomila-nowy-piec-ZDJeCIA (accessed 14.02.2023).

The second most populous city, Kalisz, was and still is one of the centres of the Polish aircraft industry. Here, in the 1970—1990s, under Soviet license and in cooperation with the USSR, the aircraft factory PZL-Kalisz produced An-2 ("corn crop dusters"), as well as engines for them. They still produce these engines, as these aircraft still fly around the world. Since 1992, there is also Pratt & Whitney Kalisz producing aircraft engines for Airbus and Bombardier. In Poznan, the old industrial centre of the voivodeship, the closure of factories that existed before the 1990s and the decline in manufacturing employment led to a decrease in population. However, new industrial enterprises have emerged in the suburban areas adjacent to Poznan, which are part of the larger Poznan agglomeration. As a result, the decline in population in Poznan is primarily a formal one, as the city's influence and urban development extend beyond its immediate boundaries and encompass the surrounding territory.

The largest group of voivodeships is the one in which both the overall population and the populations of the principal cities have decreased. These include the West Pomeranian Voivodeship (with its centre in Szczecin), the Silesian Voivodeship (Katowice), the Holy Cross Voivodeship (Kielce), the Warmian-Masurian Voivodeship (Olsztyn), the Podlaskie Voivodeship (Bialystok), the Lublin Voivodeship (Lublin), the Kuyavian-Pomeranian Voivodeship (Bydgoszcz, Torun) and the Lodz Voivodeship (Lodz).

A decrease in both the total population and the populations of the principal cities seems to indicate a generally unfavourable socio-economic situation in the region. However, the reasons for this disadvantage vary. There are two subgroups within this group of voivodeships. The first is depressed voivodeships whose population decline is associated with a reduction or even cessation of old industries and slow development of new ones or their absence. The second subgroup is backward voivodeships traditionally developing more slowly than Poland in general.

Depressive voivodeships include the West Pomeranian, Silesian, Lodz and Kuyavo-Pomeranian. Backward ones include the Holy Cross, Warmian-Masurian, Podlaskie and Lublin. The decline in the population of the West Pomeranian Voivodeship is due to its rapid deindustrialization. For instance, Szczecin's largest enterprise that existed since German times, the former shipbuilding plant named after Adolf Varsky (Stocznia Szczecińska im. Adolfa Warskiego), which built its last vessel (FESCO Vladimir) for the Far Eastern Shipping Company in 2009, and the Szczecin Metallurgical Plant (Huta Szczecin), whose large customer was this shipbuilding plant, ceased their production. Ship repairs have plummeted. In the West Pomeranian Voivodeship, unlike the Pomeranian one, new economic sectors are developing extremely slowly. The interior of the West Pomeranian Voivodeship reports a decline in the rural population. The population is "drawn" to the main cities of the voivodeship — Szczecin, Koszalin and Swinoujscie.

The Silesian Voivodeship is a classic example of a depressed old industrial area. Most of the population and economic life of the voivodeship concentrates in the Upper Silesian Industrial Region (Pol. Górnośląski Okręg Przemysłowy, GOP), established mostly during the time of the Polish People's Republic, with a population of approximately 2 million. This industrial area is the largest city in Poland, as its member cities (Katowice, Sosnowiec, Ruda Slaska, Zabrze, Chorzow, etc.) merged long ago. The specialization is typical for old-industrial areas: coal mining, metallurgy, coke production, and resource-intensive engineering. This explains the depression in the Silesian Voivodeship. It seems impossible to fully accept Popov's assertion that "during the post-socialist period the Silesian Voivodeship became one of the most striking examples of effective regional development supported by European subsidiarity programs" [21, p. 72]. If this were true, both the total voivodeship's and its principal city's populations would grow, not shrink.

The depression in the Łódź Voivodeship is associated with the degradation of light industries, mainly textiles, as well as leather and footwear industries. In the Russian Empire, Lodz was the major centre of the textile industry, the fifth most populous city after St. Petersburg, Moscow, Warsaw and Odessa (314,000 people according to the 1897 census). The industrial development of Lodz in the second half of the 20th century was determined by its orientation to the Comecon markets, mainly the USSR. At the end of the 20th century, Lodz lost this market, which ruined the light industry in the city and the voivodeship.

In the Kuyavian-Pomeranian Voivodeship, the demographic situation in Bydgoszcz, where the main city-forming enterprises, for example, PESA (Pojazdy Szynowe Pesa Bydgoszcz, production and repair of locomotives, wagons and trams), have existed since German times, is more difficult than in Torun. Most of Torun's enterprises were created during the PRL, for example, the Torun Dressing Plant (Toruńskie Zakłady Materiałów Opatrunkowych producing a wide range of sanitary and hygienic products), built in the 1950s as a plant of the Ministry of National Defense of the Polish People's Republic.

Three of the four "backward" voivodeships (Warmian-Masurian, Podlaskie and Lublin) are located along the Polish border with Russia, Lithuania, Belarus and partly Ukraine. Their relatively slow socioeconomic development can be attributed to the peculiarities of Poland's eastern border development. In pre-revolutionary times, when Warsaw was the third city of the Russian Empire, its sphere of influence extended to the territory of then Russia, including modern Lithuania and western Belarus — Vilna (Vilnius), Grodno, Brest-Litovsk (Brest). In the interwar period, the current Western Ukraine (Lviv) fell within this sphere. With the Soviet annexation of Western Belarus and Western Ukraine in 1939 and the incorporation of the Lithuanian SSR into the Soviet Union in 1940 [22], the eastern regions of present-day Poland were left without major "organizing centres", although some of them were returned to Poland in 1944 (the Bialystok region of the BSSR together with Bialystok [23]) and 1945 (from the Ukrainian SSR, the city of Przemysl with the adjacent territory, present-day Przemysl in the south-

east of the Subcarpathian Voivodeship). Secondary cities took the place of the lost "organizing centres". For the present Warmian-Masurian Voivodeship, which constituted a part of Germany before World War II, due to its geographical location (wide access to the Vistula Bay), the main "organizing centre" was Königsberg, present-day Kaliningrad.

Until the early 21st century, the eastern voivodeships had been developing more slowly than Poland in general, but still developing. However, with the introduction of a visa regime between Poland, having joined the Schengen zone, and Russia and Belarus the already established cross-border ties began to break up. This was predictable, but the Polish government took no measures to prevent it or minimize its consequences. As noted in 2009, "Polish politicians were so absorbed in joining the EU that few people thought about developing an effective regulatory system for the period after 2004. …The policy documents of the voivodeships on regional policy are largely formal..." [25, p. 76]. With the PiS government coming to power, there was an increasing number of severed ties. Some Polish sources call the country's eastern border the "eastern wall". In the Podlaskie Voivodeship, bordering Lithuania and Belarus, in the inter-census period (2011—2021), the population decreased by more than 10 % in about 60 % of its gminas. Only the gminas around Bialystok and Lomzu, the second principal city of the voivodeship, find themselves in a more favourable demographic situation (Fig. 3).

In the Warmian-Masurian Voivodeship, which shares a border only with Russia, over half of the gminas experienced a population decline of more than 10 %. In the Warmian-Masurian Voivodeship, in addition to the regions bordering the principal cities of Olsztyn and Elblag, there are several gminas that exhibit a relatively stable and healthy demographic situation. These gminas are located near the motorways connecting Olsztyn with Gdansk, Warsaw, and the Kaliningrad region. It is in these areas that the nascent Russian-Polish "cross-border regional formation" has started to become evident [26; 27]. However, the entire Braniewo County, where the Mamonowo-Braniewo, the main land Russian-Polish border crossing point, is located, suffered a population loss of more than 10 % between 2011 and 2021. In the post-socialist period, this county specialized in cross-border trade, colloquially called "shuttle trade". Its plunge caused a decrease in living standards and out-migration.

In the Lublin Voivodeship, which shares borders with Belarus and Ukraine, over half of the gminas experienced a population decline of more than 10 %. However, there are gminas adjacent to the voivodeship's main city of Lublin, as well as to major cities like Biala Podlaska, Chelm, and Zamosc, where a relatively favourable demographic situation persists. The border with Ukraine is much more "open" than that with Russia and Belarus: citizens of Ukraine have the right to visa-free entry into the Schengen zone and, thus, to Poland, but the "highway" of Ukrainian labour migration goes further south, through the Subcarpathian Voivodeship [28].

Fig. 3. Proportion of gminas with a decrease in resident population
by more than 10% in 2011—2021, by voivodeship

Compiled from: Ludność rezydująca — informacja o wynikach Narodowego Spisu Powszechnego Ludności i Mieszkań, 2022, *Warszawa: Główny Urząd Statystyczny,* URL: https://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc/ludnosc-rezydujaca-dane-nsp-2021,44,1.html (accessed 14.02.2023).

The Holy Cross Voivodeship, known as the fourth "backward" voivodeship, is marked by its economic and geographical location between Warsaw and Krakow. Between 2011 and 2021, the voivodeship faced a population decrease of more than 10 %, predominantly in the northern regions facing Warsaw and the southern regions facing Krakow. This trend is also noticeable in numerous gminas (administrative divisions) within the neighbouring Masovian Voivodeship, which shares a border with the Holy Cross Voivodeship to the north.

Conclusions

The 2021 census results indicate that Poland's demographic profile is hardly favourable. The country generally goes through an ever-increasing demographic crisis. If the current trends persist for the next 20—30 years, this crisis can be-

come a demographic catastrophe, and the negative trends will become irreversibleThe demographic policy implemented by the PiS Government, which aimed to increase the birth rate through financial incentives, did not yield significant results. In fact, it could be argued that this policy was unsuccessful. It is crucial to recognize that the birth rate and related factors are influenced more by public attitudes and prevailing demographic behavioural patterns than by specific demographic policies. These patterns and attitudes are shaped by society and cannot be radically changed by the state alone. This holds true not only for Poland but also for any other country, including Russia.

The only geodemographic region that has seen population growth in the inter-census period (2011—2021) is the Capital region, located in the centre of Poland. Warsaw ensures its development. The Coastal and Warta regions reported the smallest population decline. The main factor contributing to economic growth and thus to demographic stability in each of these regions is their economic-geographical position (Warsaw is Poland's key transport hub, Gdansk and Gdynia are seaports, and Poznan and, in general, the Greater Poland are the places where the country's major motorways intersect). Regions whose development largely relies on natural resources, as well as environmental conditions are losing their population. The creation of new industries and the reconstruction of existing ones cannot hamper this process.

The healthiest geodemographically and, accordingly, economically and socially geodemographic regions and voivodeships of Poland are those on the Vistula: the Lesser Polish Voivodeship (Krakow) in its upper reaches, the Masovian (Warsaw) in its middle reaches, the Pomeranian (Gdansk) in the lower reaches.

The communication environment framework provides a credible explanation for this, and it actually predicted it 20 years ago [30, p. 32]. Location within the Vistula basin, the "organizing axis" of the Polish state throughout its entire history, can be considered the determining factor in Poland's spatial development. The Vistula axis can ensure the country's healthy social and economic development in the foreseeable future. But this will require "pulling" most of Poland's resources, including demographic ones, to the economic centres located along the Vistula. However, in many voivodeships, especially in the eastern ones, such resources are increasingly scarce. We can agree with the statement that "uneven distribution of the benefits of integration can lead to increased socio-economic imbalances (within Poland. — *V. M., I. S.*) and slow down national socio-economic development" [31, p. 58].

The geodemography of the old-industrial voivodeships (West Pomeranian, Lower Silesian, Silesian, Lodz, Kuyavo-Pomorsky) is quite peculiar. In some cases, it is possible to identify the economic and social causes of population decline in them clearly and easily, while in other areas of these voivodeships, geodemographic and socio-economic trends diverge. In the West Pomeranian, Kuyavian-Pomeranian and Lodz voivodeships, the reason for the decline in the population is their general economic decline. In the West Pomeranian Voivodeship, demo-

graphic deterioration is observed in both urban and rural areas, in the Kuyavian-Pomeranian and Lodz Voivodeships, it affects mainly cities, while the rural areas remain relatively stable. In the Silesian and Lower Silesian Voivodeships, rehabilitation of old enterprises and construction of new ones often lead not to an increase or at least a stabilization of the population but to its reduction. The increase in productivity due to the commissioning of new equipment reduces the need for labour, as a result, people leave prosperous and even economically dynamic cities and areas. The Lower Silesian city of Legnica is a clear illustration of this.

The eastern voivodeships (Warmian-Masurian, Podlaskie, Lublin), along with the Holy Cross Voivodeship in the central part of the country, are characterized by a challenging geodemographic situation. The primary factor influencing this situation is their economic-geographical location. The eastern voivodeships are on the border, the Holy Cross Voivodeship is between Warsaw and Krakow. The geodemography in the three "backward" eastern voivodeships cannot improve without a significant improvement in cross-border cooperation with Russia and Belarus. In present political realities, it is impossible to expect not only radical but even small improvements. Long before the current political events, Kuznetsov noted that "Poland has demonstrated the unfortunate influence of an ill-considered foreign policy based on historical fears on its economic connections with Russia" [32, p. 82]. Thus, the eastern voivodeships will continue to deteriorate demographically, economically, and socially. The "fight against the Russian threat", which is the basis of the foreign policy of the current PiS government, creates more problems for Poland than for Russia. As strange as it may sound in the current situation, Poland is more interested in the destruction of its "eastern wall" than Russia and Belarus, although it keeps fortifying it.

In the poor voivodeships of Eastern Poland, more than anywhere else in the country, the spirit of the first Polish-Lithuanian Commonwealth of Both Nations is preserved, expressed by the ancient motto of the Polish nobility "God, Honour, Fatherland". The population of these voivodeships, especially the rural population, sees "Law and Justice" as the best defenders of law and justice. It is here that the geodemographic situation is very difficult. So difficult that soon the population decline can become massive. The consequences of this for the Polish state are unpredictable.

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ECONOMY

THE IMPACT OF THE FOOD EMBARGO ON CONSUMER PREFERENCES AND CROSS-BORDER PRACTICES IN THE KALININGRAD REGION

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The Russian food market has been a fascinating subject for researchers investigating food security risks and ways to mitigate them since the embargo was imposed in 2014. The Kaliningrad region, an exclave of Russia, responded more sensitively to the restrictions than any other territory of the country due to the heavy dependence of its food market on imported finished products and raw materials, as well as the transit from Russia via third countries. This study aims to explore how the consumer preferences of Kaliningraders changed in 2014—2021 under the food embargo. The research also investigates changes in the cross-border mobility of the region's residents with regard to the practice of shopping for groceries in neighbouring countries. The principal method used in the study is survey research. A survey of 1,019 respondents was conducted in September 2021. Additionally, a comparative analysis of average food prices in the region and neighbouring countries from 2012 to 2019 was carried out based on data from Kaliningradstat and the national statistics services in Poland and Lithuania. The ways to obtain embargoed food were systematised using content analysis of social media, advertising and joint purchase services, travel agency websites, regional news portals and blogs. The study found that rising prices for commodity groups falling under the import ban were the most significant change in the regional food market. As a result, the share of Kaliningrad and Belarusian manufacturers in the regional market basket of consumer goods rose dramatically, as the volume and range of products increased and new manufacturers entered the market. At the same time, the dependence of purchases of "sanctioned" goods on non-material reasons (quality, personal preferences) determined Kaliningraders' continued commitment to the "old" strategies despite significant restrictions.

Keywords:
consumer preferences, cross-border mobility, food security, food embargo, sanctions and counter-sanctions, prices, borderland, Kaliningrad region

Introduction and Problem Statement

Regional food markets are influenced not only by internal (local socio-economic and institutional conditions) but also by external factors. Some of them have a more profound effect on border regions. These include the border regime and its changes, which determine the freedom of movement of people and goods [1], as well as the price policy of sellers on both sides of the border. Cross-border price gradients are important for many market players, as they determine the preferences of residents buying food products, the strategy of foodstuff processors purchasing agricultural raw materials, and the policy of stores and retailers [2; 3].

Russia's restrictions on the import of agricultural produce and food products from some Western countries introduced in 2014 impacted all food market participants — from producers and processors to trade organizations. These changes affected the consumer whose usual food preferences had to transform. The Kaliningrad region as an import-dependent region in terms of food faced a radical market restructuring. In addition, in the Russian exclave, the problems of economic availability of food intensified. This was both the direct impact of the food embargo and the result of the high sensitivity of the residents' incomes and the regional economy to the ruble exchange rate [4; 5] and the growing gap between the regional and the Russian average purchasing power for a wide range of products [6].

This paper aims to assess the transformation in consumer preferences in the Kaliningrad region under the influence of the food embargo between 2014 and 2021. It also considers changes in the exclave residents' typical cross-border practices of grocery shopping in the neighbouring countries.

Previous Studies

One of the apparent effects of the food embargo on the population of Russia was the growth of consumer prices caused by the reduction in imports, low self-sufficiency in many commodities and reduced competition in the domestic market [7; 8]. Household incomes were also decreasing. Thus there was a shift in consumption to less expensive, often low-quality, goods [7].

Another effect felt by the consumers was an increasingly limited choice [9]. Over the years, it extended but transformed profoundly. New and many "old" domestic producers came into the market, the range of products imported from not embargoed countries expanded, and the available range of elite and dietary products changed in terms of price and/or quality. The possible explanations include low investment attractiveness of the food industry, staff shortage, etc. [10].

Berendeeva and Ratnikova have conducted a comparative study of the effects of changes in price and supply (substitution effects) [11]. They found that the

trends differed in rural and urban areas. For example, in cities, the market for fruit and vegetables has undergone much more significant changes than in rural areas, where residents have their own gardens [11]. According to the researchers, the transformations in the capital regions also differed from those in other territories of the country, since until 2014 the share of imported products was higher there.

Some studies prove that the food embargo has led to the growth in the production of certain types of goods in Russia. Volchkova and Kuznetsova note a successful import substitution in Russia in three product groups: poultry, pork and tomatoes [12]. Receiving active state support, agricultural producers often continued to be market-oriented, i. e. they increased the production of crops most popular domestically and internationally sometimes to the detriment of other less profitable but still important products [13].

In this context, the Kaliningrad region is a vivid example of a region that, on the one hand, in 2014, was extremely highly dependent on imported food, on the other hand, tended to lag behind the average Russian level of purchasing power for a wide range of food products.

In addition, the Kaliningrad region saw rapid growth in agricultural production after the introduction of the food embargo. This was largely due to active state support for the agri industry [14]. The potential food market capacity, a large share of unused agricultural land, and a relatively developed food industry also favoured a fairly rapid development of the region's agri industry [15]. The production of vegetables, fruit and berries, milk and milk products, and meat and meat products has increased many-fold. However, the threshold values for self-sufficiency determined by the "Food Security Doctrine of the Russian Federation" have not been achieved in most industries under sanctions (except for meat production). The food industry kept struggling as it was suffering severely from disruptions to cross-border trade in raw materials (import of meat and milk powder) [14].

There is another range of studies related to the topic of this research. They all focus on cross-border practices and their specific kind, shopping trips to a neighbouring country. Cross-border consumer mobility is associated not only with price gradients but also with the openness of borders [16]. The literature also describes a distinct phenomenon of "shopping for entertainment". This is trips to another country to buy food products to try something new and unusual [16].

There are three approaches to studying cross-border shopping practices:

1) assessment of the influence of macrofactors stimulating mobility. These include personal income level, differences in currencies and exchange rates, etc.;

2) assessment of meso- and microfactors characterizing the availability of retail facilities and their technical and economic parameters;

3) assessment of personal factors determining consumer behaviour (mobility, taste preferences, the importance of shopping choice, etc.) [17; 18].

Zotova et al. provided a comprehensive summary of the extensive empirical evidence regarding cross-border mobility along various regions of the Russian borders [19]. According to their study, people in the Kaliningrad region had a strong motivation to overcome all the obstacles. The abolition of the local border traffic (LBT) regime did not cause radical changes in consumer behaviour here when it came to shopping in Polish border supermarkets [19]. Our previous studies also prove that residents of the Kaliningrad region, accustomed to travelling abroad to buy groceries, in general, continued doing so after 2014. At the same time, the COVID-19 pandemic left the exclave's population almost no choice but to switch to locally available analogues [6].

However, the issue of changing cross-border practices under the influence of external factors that transform the domestic market in regions remains understudied. In addition, it is not only the studies describing the transformation of the level of income and consumption that are interesting but also those highlighting the changes in consumer behaviour caused by the food embargo.

Materials and methods

The study consisted of several blocks. The first was a comparative retrospective analysis of consumer price indices for food products in the Kaliningrad region and in the neighbouring countries of Poland and Lithuania[1] before the imposition of sanctions and counter-sanctions (2012—2013) and between 2014 and 2020, when the COVID-19 pandemic began, with its impact overlapping the consequences of 2014 restrictions. The aim was to identify the changes in price gradients encouraging cross-border food shopping trips and shopping for products brought from the neighbouring countries. There were several food products selected for the analysis. They all are compatible across Russian (national and regional), Polish and Lithuanian statistics (Table 1). Sources of information were portals of official state statistics services of Russia,[2] Poland[3] and Lithuania,[4] as well as official statistical publications (Lithuania in figures). The cost of goods in Polish zloty and euro was converted into Russian rubles according to "Calculator. Reference portal".[5] The study used the end of the year data.

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**Correspondence of food items in the statistics of Russia,
Poland and Lithuania**

Name, unit		
in Russian statistics	in Polish statistics	in Lithuanian statistics
Milk and milk products (milk, yoghurt, etc.)		
Sterilized whole drinking milk, 2.5—3.2 % fat, l	Sterilized cow's milk, 3—3.5 % fat, l	Pasteurized milk 2.5 % fat, l
Full-fat cottage cheese, kg	Semi-fat cottage cheese, kg	Cottage cheese 9 % fat, 200 g
Cheese		
Hard and soft rennet cheeses, kg	Maturing cheese, kg	Fermented cheese, 45—50 %, kg
Fresh meat		
Beef on the bone, kg	Beef on the bone (roast beef), kg	Beef ham on the bone, kg
Pork on the bone, kg	Bone-in pork (loin), kg	Bone-in pork shoulder, kg
Chickens, chilled and frozen, kg	Eviscerated chicken, kg	Broiler chickens, kg
Sausage and cooked meat products		
Semi-smoked and cooked-smoked sausages, kg	Smoked sausage products, kg	Cold smoked sausage products of the highest quality, kg
Fish and Seafood		
Salted herring, kg	Salted headless herring, kg	Salted herring, kg
Vegetables		
Potatoes, kg	Potatoes, kg	Potatoes, kg
Carrots, kg	Carrots, kg	Carrots, kg
Bulb onions, kg	Onions, kg	Onions, kg
Fruit and berries		
Apples, kg	Apples, kg	Apples, kg

The second block was an overview of the possibilities for buying goods prohibited for import into Russia after 2014. This involved a content analysis of social networks (VKontakte, Facebook*, Instagram*), ad services (Avito), joint procurement services, travel agency websites, regional news portals (Newkaliningrad.ru, klops.ru, kgd.ru), blogs' entries on purchasing "sanctioned" products in the Kaliningrad region. The study was conducted in September-November 2022 and included pages of users of social networks and ads that were active at that time. The units of meaning of the studied content were current and archival data on food shopping tours to Poland and Lithuania, information about food delivery services from Poland and Lithuania, and data on trade in "sanctioned" goods in the region. The unit of measure was the number of subscribers in social networks as of November 8, 2022.

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[1] Belongs to Meta — an organization, whose activities are recognized as extremist and banned in Russia.

The third block involved assessing the changes in consumer preferences for food products and cross-border mobility after 2014 according to a major regional survey conducted in September 2021.

It consisted of 1,019 interviews. The survey used a stratified three-stage quota sampling combined with a random route sampling. The stratification of the territory ensured the representativeness in terms of the spatial differences observed in the Kaliningrad region. Strata were established by factoring in their geographical location, population, economic specialization, and transport infrastructure:

1) regional centre: Kaliningrad;

2) coastal municipalities: Zelenogradsk, Pionersk, Svetlogorsk, Yantarniy and Baltiysk districts;

3) municipalities oriented to Kaliningrad: Guryevsk and Svetlyi districts;

4) municipalities in the centre of the region: Gvardeisk, Chernyakhovsk, Gusev and Polessk districts;

5) municipalities bordering Lithuania: Neman, Nesterov, Krasnoznamensk, Slavsk and Sovietsk districts;

6) municipalities bordering Poland: Ozersk, Pravdinsk, Bagrationovsk, Mamonovo and Ladushkin districts.

The first sampling stage was determining the number of respondents in each stratum by their share in the statistical population. The second stage was finalizing the survey sites factoring in the size of the urban and rural population in each stratum. The third stage was establishing sex and age quotas for respondents in each survey site according to the proportion of sex and age groups in the general population, i. e. the adult population of the Kaliningrad region.

The questions concerned cross-border practices, the role of imported food in the consumption structure, changes in individual food niches and the public perception of them.

Research Results and Discussion

Cross-border price gradients. The changes in the consumer price index for food products in the Kaliningrad region differed significantly from those in the neighbouring countries during almost the entire studied period (Fig. 1). While in the EU countries, the years 2013—2015 were associated with almost zero food inflation, in Russia prices soared by more than 15 %, in the Kaliningrad region by almost 25 %. This was the result of, firstly, the rise in prices for imported goods due to the ruble's fall against world currencies in 2014 and, secondly, the introduction of the embargo on a range of food products. Starting from 2016, the rate of changes in prices has generally levelled off and fluctuated within 100—105 % of the previous year's values.
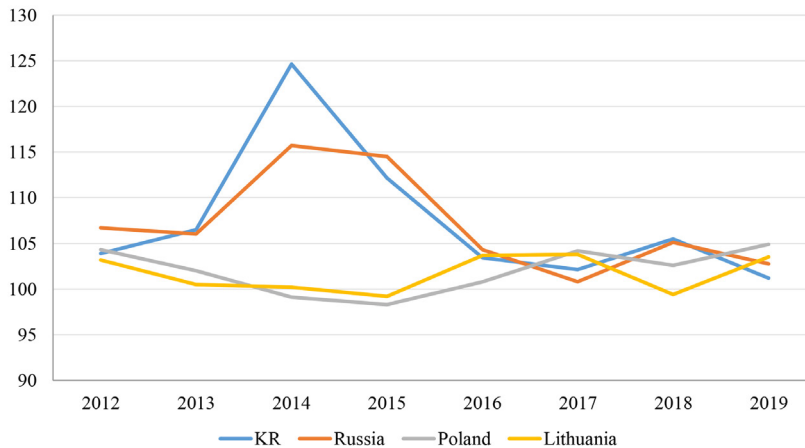
Fig. 1. Consumer price index for food products
(not including alcoholic beverages and tobacco), % of the previous year

Source: Consumer price indices for goods and services, 2022, *EMISS,* URL: https://fedstat.ru/indicator/31074 (accessed 10.10.2022) ; CPI-based consumer price changes, 2022, *Statistics Lithuania,* URL: https://osp.stat.gov.lt/statistiniu-rodikliu-analize?hash=-94c9a88f-ec80-4992-9789-7167cc3d9b5a (accessed 10.10.2022) ; Yearly price indices of consumer goods and services from 1950, 2022, *Statistics Poland,* URL: https://stat.gov.pl/en/topics/prices-trade/price-indices/price-indices-of-consumer-goods-and-services/yearly-price-indices-of-consumer-goods-and-services-from-1950/ (accessed 10.10.2022).

As Table 2 shows, the price for considered food products in the region during this period was higher than that for both Polish and Lithuanian goods. In 2012—2013, the largest gap in the prices was recorded for some milk products (1.4—1.5-fold difference), chicken (with Poland, 1.5—1.6-fold), sausage and cooked meat products (2-fold), carrots (with Poland, 1.6 times), potatoes (1.4-fold), apples (1.6-fold). Only fish and seafood were cheaper in the Kaliningrad region than in the neighbouring countries.

Table 2

**Difference in prices for some food products in the Kaliningrad region compared
to those in Poland and Lithuania, -fold**

Product	Country	2012	2013	2014	2015	2016	2017	2018	2019
Milk and milk products (milk, yoghurt, etc.)									
Sterilized whole drinking milk, 2.5—3.2 % fat, l	PL	1.5	1.5	1.4	1.2	1.2	1.7	1.7	1.5
	LT	1.4	1.4	1.3	1.1	1.0	1.4	1.5	1.3
Full-fat cottage cheese, kg	PL	1.7	1.5	1.5	1.1	1.1	1.5	1.3	1.2
	LT	1.4	1.3	1.2	0.9	1.0	1.2	1.2	1.1
Cheese									
Hard and soft rennet cheeses, kg	PL	—	—	1.5	1.2	1.2	1.4	1.3	1.3
	LT	—	—	—	—	0.8	1.0	0.9	0.9
Fresh meat									
Beef on the bone, kg	PL	1.01	0.95	0.96	0.8	0.7	0.9	0.8	0.7
	LT	1.1	1.1	1.2	0.9	0.9	1.0	1.0	0.9

The end of Table 2

Pork on the bone, kg	PL	1.2	1.1	1.4	0.9	0.8	—	—	—
	LT	—	—	—	—	0.8	1.0	1.1	0.8
Chickens, chilled and frozen, kg	PL	1.6	1.5	1.6	1.1	1.1	1.4	1.2	1.1
	LT	1.1	1.1	1.1	0.8	0.8	0.9	0.9	0.8
Sausage and cooked meat products									
Semi-smoked and cooked-smoked sausages, kg	PL	2.0	2.0	2.3	1.7	1.5	1.7	1.6	1.4
	LT	—	—	—	—	0.5	0.6	0.6	0.5
Fish and Seafood									
Salted herring, kg	PL	0.9	0.8	0.9	0.9	0.8	1.0	0.8	—
	LT	—	—	—	—	0.9	1.1	1.0	0.8
Vegetables									
Potatoes, kg	PL	1.3	1.5	3.2	0.7	0.7	1.4	0.7	0.3
	LT	1.3	1.6	2.03	0.8	0.6	1.3	0.8	0.6
Carrots, kg	PL	1.6	1.7	2.4	0.9	0.9	1.2	0.8	0.6
	LT	1.1	1.3	2.1	0.8	1.1	1.8	1.5	1.1
Bulb onions, kg	PL	1.1	1.1	1.8	0.7	0.7	1.1	0.7	0.5
	LT	—	—	—	—	1.1	1.9	1.1	0.9
Fruit and berries									
Apples, kg	PL	—	1.7	3.4	1.7	1.5	1.6	2.0	1.2
	LT	1.4	1.6	2.5	1.4	1.6	1.8	1.9	1.2

Note: PL — Poland, LT — Lithuania, following the Russian classification of countries of the world.

In 2014, the price differences were the most profound: the prices for fruit and vegetables, and sausages in the Kaliningrad region exceeded those in Poland and Lithuania 2—3.5-fold. However, the fall of the ruble against world currencies in 2014 led to prices soaring for both food products purchased within the region and goods purchased in Poland or Lithuania. Since 2015, buying food abroad has become less attractive, as the price differences have decreased for some of the products considered. At the same time, until 2019, the prices in the region were much higher than those in Poland for milk (1.5-fold), sausage and cooked meat products (1.4-fold), cheeses (1.3-fold), apples (1.2-fold), full-fat cottage cheese (1.2-fold) and than those in Lithuania for milk (1.3-fold) and apples (1.2-fold).

Besides price gradients, throughout the period, Polish and Lithuanian food products differed from those in the Kaliningrad region by their greater variety. This applies primarily to milk and milk products, sausage and cooked meat products, canned meat, vegetables and fruit.

Ways to purchase "sanctioned" goods in the Kaliningrad region. Before the 2020—2021 COVID-19 pandemic restrictions, residents of the Kaliningrad region had numerous opportunities to buy food products in neighbouring countries (Table 3). The regional tourist market offered a wide range of tours to Poland and Lithuania, including stops at supermarkets. However, after 2015, only tours to Poland remained popular, as trips to Lithuania became less profitable due to a significant price increase following its accession to the eurozone. Specialized shopping tours to Polish cities like Gdansk, Bartoszyce, Branjowo, Elblag, and others were particularly popular. In Lithuania, Kaunas, Vilnius, and Klaipeda were the most popular cities for shopping. Transfers and ride-sharing services were also commonly used for these shopping trips. It is challenging to assess the retrospective popularity of such tours. As of November 2022, the share of subscribers in social network groups offering these tours did not exceed 0.6 % of the region's population.

Table 3

Ways to purchase goods from Poland and Lithuania in the Kaliningrad region (according to 2012 data)

Method	Description	Example	Reach (number of social media followers as of November 8, 2022)
As part of tourist trips	Special shopping tour. Poland: to nearby towns and cities within the LBT area (for example, Gdansk, Branjovo, Elblag, Gdynia, Bartoszyce, Olsztyn). Lithuania: Kaunas, Vilnius, Klaipeda, Trakai. Usually lasts 1—2 days, with a visit to grocery stores: "Auchan", Lidl, "Biedronka" in Poland, "Maxima", "Rimi", "Hypermarket" in Lithuania	"Tropikanka" (travel agency)	1,650 (Instagram)
		"Tsentr poezdok v Polshu. Transfer" (Eng. Centre for trips to Poland. Transfer) (VK group)	3,164 (VK)
		"Baltic-tourist" (travel agency)	3,008 (Instagram), 1,023 (VK)
		"Eurotour" (travel agency)	5,600 (VK)
		"Perevozoff39" (VK group)	4,081 (VK)
		"Shengenskie vizy v Kaliningrade, Polsha, Germania" (Eng. "Schengen visas in Kaliningrad, Poland, Germany") (VK group)	2,593 (VK)
		"Visa-market" (travel agency)	11,794 (VK)
		"Kaleidoskop Tour" (travel agency)	976 (VK)
		"Golden Travel Kaliningrad"	1,650 (VK)
		"Bestway-Kaliningrad. Poezdki v Polshu i Yevropu" (Eng. "Bestway-Kaliningrad. Trips to Poland and Europe") (VK group)	1,332 (VK)
		"Shop-tury v Polshu, transfer, dostavka tovarov" (Eng. "Shop-Tours to Poland, transfer, delivery") (vipbus39, VK group)	3,433 (VK)
	Sightseeing tours of the cities of Poland and Lithuania including a visit to a shopping centre	Most travel agencies of the Kaliningrad region	—
	Ride-sharing. Transfers (individual and group)	"Kaliningrad. Poputchiki. Poezdki v Polshu" (Eng. "Kaliningrad. Fellow Travellers. Trips to Poland") (VK group)	4,087 (VK)
		IE Berezhnoy A. N. (ride-sharing type of trips)	2,178 (VK)

Food delivery from Poland and Lithuania	The service is provided by companies that specialize in organizing the delivery of both food and non-food products. There are also courier services or parcel delivery from Poland and Lithuania to Kaliningrad. In other countries to Kaliningrad. In addition, they provide delivery of goods to Russia. Group buying.	"Shop-tury v Polshu, transfer, dostavka tovarov" (Eng. "Shop-Tours to Poland, transfer, delivery") (vipbus39, VK group) — 3,433 (VK)
		"Tovary iz Polshi. Kaliningrad" (Eng. "Goods from Poland. Kaliningrad" (VK group) — 8,050 (VK)
		BR39.RU (online store, LLC "S22") — 10,359 (VK)
		Allegroexpress.ru (online store) — 2,801 (VK)
		FastBox.ru (online store) — 20,073 (VK)
		Allegro39.ru (online store) — 15,680 (VK)
		"Polskie produkty. Polska_39" (Eng. "Polish products. Polska_39") — 464 ("VK"), 8,448 ("Instagram")
		"Polskie produkty s dostavkoi" (Eng. "Polish products delivery") — 1,320 (Instagram)
		"Sovnestnye pokupki v Kaliningrade SP39.RU" (Eng. "Joint purchases in Kaliningrad SP39.RU") (Internet portal) — Views of food purchasing in Poland: from 500 to 2,000 ("VK")
Purchases at retail outlets in Kaliningrad and the region	Retail outlets in the Kaliningrad region, including markets, small shops, trade stands, unregulated street trading — pop-up stalls, and car boot selling (including with truckers as intermediaries). City fairs	Independent stores and outlets in shopping centres, mini-markets — —

The introduction of a simplified LBT regime between Russia and Poland in 2012 stimulated bilateral cross-border passenger flows and, thus, the development of retail and wholesale trade in Polish voivodeships along the state border with the Russian Federation [20—23]. Some Polish shops offered free shopping tours to attract buyers from the Kaliningrad region. Free bus trips to the Avangard shopping centre in Bartoszyce (59 km from Kaliningrad) in 2016—2018 are an illustrative example of this. Existing until 2016, the LBT regime undoubtedly contributed to the increase in the consumption of food products purchased in Poland by the residents of the exclave. The suspension of the regime reduced cross-border cooperation and similar cross-border practices, although it did not stop them [24—26].

The international political situation and relations with neighbouring countries encouraged the development of cross-border business, which in many cases was selling goods from Poland and Lithuania on the Kaliningrad market. This includes delivering products from neighbouring countries and selling them in the region.

A review of food delivery services from Poland and Lithuania shows that their providers are mostly organizations engaged in the delivery of goods (including non-food products) from Europe via specialized online stores. Subsequent delivery to other regions of Russia has increased their popularity among their residents. Therefore, the coverage of such social networking groups is several times (from two to five) higher than that of groups organizing shopping tours. At the same time, users from other regions of Russia are more likely to order non-food products than food products. According to the current data, food delivery services are few and far between, reaching up to 1 % of the region's population.

The range of products from Poland and Lithuania in the region's retail trade includes mostly milk and milk products, cheeses, meat and sausage and confectionery products. The retail outlets for these goods were diverse: food markets, shops and trade stands, and unregulated street trading (pop-up stalls, car boot selling). In the regional news portals, the latest information on the destruction of seized "sanctioned" food dates back to September 2021. At the same time, according to the Kaliningrad customs, they seized more than a ton of "sanctioned" food only in 2021.[1]

It is important to note that the result of the increased difficulty of purchasing"sanctioned" goods in the neighbouring countries is not only their gradual replacement by their counterparts produced in other regions of Russia and coun-

[1] During the year, Kaliningrad customs officers seized more than a ton of sanctioned products, *2022, KGD.RU,* URL: https://kgd.ru/news/society/item/99123-za-god-kaliningradskie-tamozhenniki-izyali-bolee-tonny-sankcionnyh-produktov (accessed 08.11.2022).

tries not subjected to the food embargo but also the emergence of new industries in the region. For instance, "Pan Boczek" in Kaliningrad produces national Polish meat delicacies; local artisan manufacturers make "sanctioned" kinds of cheese in the towns of Neman ("Tilsit-Ragnit"), Guryevsk ("Shaaken Dorf"), Gusev ("Branden"), Pravdinsk ("Noidam"), Svetly ("Bravo Casaro"). The Lithuanian cuisine shop "Shakotis" in Zelenogradsk makes Sakotis, a national Lithuanian cake, while regional gastronomic fairs sell Kurteshkalach, a Hungarian pastry. Kaliningrad confectioners selling products through social networks offer a wide variety of European pastries. However, these goods might be similar to "sanctioned" products in terms of quality but not price.

The situation with phasing out "sanctioned" fruit and vegetables is different. The measures introduced to replace prohibited imports with local products led to the saturation of the Kaliningrad market with products generally similar to the imported ones in both quality and price. The measures included planting several industrial apple orchards in the region, opening new large greenhouse facilities for year-round production of vegetables (tomatoes, cucumbers, salad plants, herbs) and berry plantations, and creating the Kaliningrad Fruit Nursery.

Consumer preferences in food products and cross-border mobility after 2014. According to the conducted sociological study, until 2014, 58 % of the Kaliningrad region's population consumed food products whose import into Russia was prohibited under the embargo; 44.8 % of respondents said that the sanctioned goods had accounted for a small part of their grocery basket; 13.1 % of respondents state that such products dominated their purchases in the corresponding niches. Until 2014, the practice of buying products under embargo was more common among the region's residents aged 25—54 years in good or very good financial standing. In terms of their occupation, these were experts and managers (chief executives, entrepreneurs, heads of departments). The low popularity of such practices among military and law enforcement personnel seems understandable as there are restrictions on their cross-border travel.

Spatial differentiation in the importance of "sanctioned" products is mostly insignificant: the share of those who consumed such products ranges from 51 to 54 % everywhere, except for Kaliningrad (64 %) and the areas bordering on Poland (41 %). A possible explanation for the increased share of consumption of "sanctioned" products in the areas bordering on Lithuania might be their ethnic composition and a pedestrian border crossing point in Sovetsk. Traditionally, Lithuanians living in the region concentrate in Kaliningrad (18 %, according to the 2010 national census) and municipalities bordering on Lithuania (51 %). In these areas, there are enterprises under the Lithuanian jurisdiction (for example, Viciunai-Rus LLC) attracting temporary workers, and migrants from the neighbouring republic. The popularity of Lithuanian goods among them is higher.

In the case of Kaliningrad, this is due to the greater population mobility, which is generally characteristic of residents of large cities. In the border municipality of Bagrationovk, through which the main motorways to Poland go and where there are several road border crossing points, more than three-quarters of the population live in rural areas and do not have ample opportunities to travel abroad. According to the survey, until 2014, more than 40 % of residents of rural areas of the Kaliningrad region did not buy products covered later by the embargo (33 % of residents of urban areas). However, one of the probable explanations for this is the unwillingness of the respondents living in the borderland with Poland to answer questions about the purchase of Polish goods honestly, especially when it came to illegal imports[1].

The majority of residents who were previously reliant on prohibited food imports had to make significant changes to the range of products they consumed. Adjusting to the restrictions increased the consumption of Russian (20.6 % of respondents) and Belarusian products (31.4 %), and led to the elimination of certain products not having high-quality analogues (14.8 %).

In the Kaliningrad region, a high share of the population (43 % of respondents) continued buying prohibited imports despite the food embargo. They purchase them through different channels (Fig. 2): most often, residents of the Kaliningrad region buy what they need either from private sellers (45 %) importing products from Poland "for personal consumption" in large volumes or in small private stores (36 %) illegally selling such products. At the same time, buying from resellers is almost the only opportunity to purchase the necessary goods in the municipalities remote from the border with Poland, i. e. the Neman, Nesterov, Slavsk, Polessk, Chernyakhovsk districts, as well as in the Gusev district located relatively close to the border with Poland. More than 70 % of people buying prohibited products made purchases this way. Purchasing in small private stores is most typical for residents of cities (Kaliningrad, Sovetsk) and municipalities gravitating to the Kaliningrad agglomeration (Guryevsk and Zelenogradsk municipal districts), Baltiysk city district. Residents of the districts on the Polish border tended to shop for groceries abroad while travelling independently: these are Bagrationovsk (42 %), Gusev (24 %), and Guryevsk (37 %) districts.

There are several reasons for the sustainability of consumer preferences noted above. According to the respondents, the major ones are the quality of imported products and personal taste preferences. The lack of similar products in the local market is in the third place. Lower price is only the fourth leading reason. At the

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[1] A resident of Bagrationovsk tried to bring over 400 kg of sanctioned goods from Poland, *Arguments and Facts*, April 30, 2019, URL: https://klg.aif.ru/incidents/details/zhitel_bagrationovska_popytalsya_vvezti_iz_polshi_bolee_400_kg_sankcionki (accessed 16.11.2022).

same time, people with different income levels stated different reasons for buying "sanctioned" food. Residents in bad and very bad financial standing were much more likely to buy "sanctioned" goods due to their low cost (18 % versus 13 % for the sample). Kaliningraders characterizing their financial situation as good or very good placed higher importance on the width of the range of "sanctioned" products.
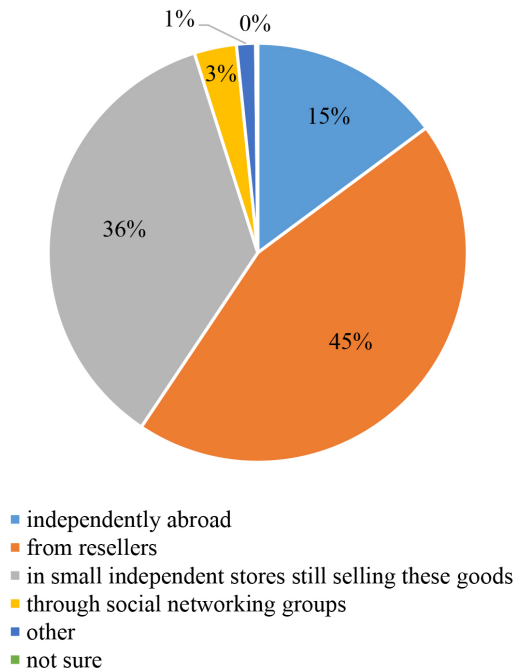
Fig. 2. Ways to purchase "sanctioned" goods in the Kaliningrad region

According to the study, residents of the Kaliningrad region demonstrate a high level of loyalty towards certain categories of "sanctioned" products. These include cheeses, sausages, other meat products, and milk products (Fig. 3). This clearly correlates with the level of the region's self-sufficiency in these goods. The least important for the respondents are imported fish and seafood. Their production in the region is considered excessive: 300,000 tons per year with consumers' consumption of 20,000 tons per year.[1] At the same time, according to our previous calculations, food self-sufficiency, for instance, in milk and dairy products is 76 %, which is low considering the "doctrinal" threshold of 90 % [14].

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[1] "Fishery Complex of the Kaliningrad Region" (within the framework of the State Program of the Kaliningrad Region "Development of the Fishery Complex for 2014—2019. Stage 1"): Analytical note / Kaliningradstat. Kaliningrad, 2020.
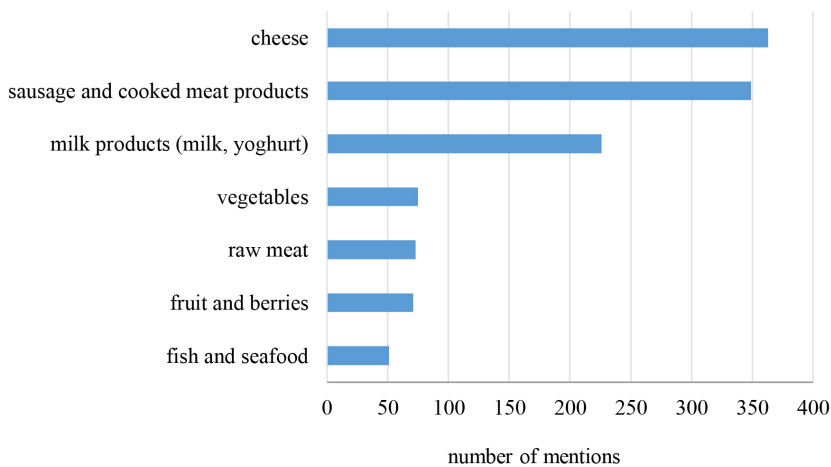
Fig. 3. "Sanctioned" goods that residents of the Kaliningrad region continued
to buy after 2014

Respondents in the region also highlighted that the food embargo had a notable effect on encouraging some residents to engage in farming and home-production of certain food items such as cheese, cottage cheese, and bread. However, such strategies are rare.

Approximately half of the respondents observed a significant increase in the volume and variety of products available in stores, as well as the emergence of new local manufacturers in the Kaliningrad region. The changes regarding food from other regions of Russia and countries not subject to sanctions are more subtle. A significant proportion of respondents, around a quarter, noted an increase in the availability of Belarusian products in retail outlets. A large group of respondents mentioned the increase in the range of food products from Kazakhstan. However, this is primarily confectionery products not covered by the food embargo.

One of the major changes in the food market, mentioned by 83.3 % of residents of the Kaliningrad region, is the increase in prices for items banned from import. At the same time, these changes were most significant for residents characterizing their financial situation as bad or very bad (42 % of respondents in this category); 61 % of respondents believe that good quality products at competitive prices disappeared after 2014; 34 % noticed goods produced in Russia under well-known foreign brands banned from import; 33.8 % expressed the opinion that the range of niche products (delicacies, dietary products, lactose-free milk) has significantly decreased or completely disappeared.

One of the questions asked the respondents to name brands or manufacturers in some product niches ("sanctioned" ones) currently dominating their purchases.

There are two distinct trends for milk products. The first is the loyalty to local producers with the absolute dominance of products by "Zalessky Fermer", which has tremendously increased production capacity and volume after the introduction of the food embargo. The second is the focus on Belarusian producers who flooded the market holding a dominant position in cheeses.

The preferences in sausage and meat products are more diversified. A distinctive feature is the continued strong loyalty to Polish products. That correlates with the situation in the meat industry (production of sausage and meat products), whose development has been hampered since 2014 by the disruption in cross-border trade in raw materials and insufficiency of own raw materials, despite the growth in meat production.

The number of people who found it difficult to answer the question about fruit and vegetable producers is so large that it does not allow drawing statistically significant conclusions about preferences in this category. Presumably, the population does not pay much attention to the manufacturer in these product categories focusing more on "what is available", appearance and price.

One of the typical consumer behaviour strategies for a borderland is independent shopping trips to neighbouring countries. According to the survey, 35.7 % of the Kaliningrad region's population visited Poland, and 17.8 % — Lithuania. High travel intensity (once a month or more) is typical for 11.4 and 3.4 % of the population, respectively.

Among the purposes of trips to Poland, the first place is shared by leisure (visiting museums, cafes, cultural events, and attractions) and food shopping. In trips to Lithuania, the latter was not so popular due to the higher cost of products.

Among the cross-border practices, the centre-peripheral gradient is clearly expressed while the factor of the immediate neighbourhood is not much manifested. The population characterized by such mobility resided mainly in Kaliningrad and the surrounding Guryevsk municipal district. Interestingly, grocery shopping trips were most often associated with a bargain price. At the same time, the most affluent population of the region mainly resides in Kaliningrad and its suburbs. The combination of factors is quite curious: higher incomes, greater mobility and a more pronounced desire to save on grocery shopping. At the same time, very few respondents in the municipalities bordering Poland shopped there regularly. Possible reasons for this have been mentioned above.

Generally, across the sample, respondents who visited Poland mostly rated their financial situation as average, suggesting that in many ways such trips were a means of saving rather than satisfying taste needs.

Among the population who were regular travelers to Poland before the borders closed due to COVID-19 pandemic restrictions, 53 % of respondents indicated a decline in the frequency of their trips from year to year. According to their feedback, the most significant reason for this decline was the decreasing

benefits of such trips, primarily influenced by the changing exchange rate of the Russian ruble against the Polish currency. The growth in associated costs (insurance, visa) and decreased incomes were also important. Another factor was the abolition of the LBT regime. A small number of respondents reported that they had stopped their trips to Poland because they believed it had become impossible to bring food across the border. However, it is important to note that the 2014 food embargo did not restrict the transportation of products for personal consumption.

Conclusions

One of the main effects of the food embargo on consumers in Russia was the increase in food prices. The interior regions responded with an increase in consumer spending, a reduction in consumption, or a change in the food basket in favour of a cheaper segment. This study shows that the residents of the Kaliningrad region additionally had the fourth option: they could continue purchasing "sanctioned" goods abroad or from resellers. Such a strategy underwent some changes between 2014 and 2021.

Significant cross-border price gradients generally made food shopping in Poland profitable until 2019, but the benefits were declining due to negative changes in exchange rates. Nevertheless, buying Polish cheese, milk, sausages and other products was much cheaper. In contrast, the profitability of buying fruit and vegetables fell due to the increase in local production.

Until 2014, almost 60 % of the Kaliningrad region's population consumed products banned from import. Although statistical analysis records the financial profitability of such purchases, the survey data show that the share of those who purchased "sanctioned" goods is higher among the residents in good and very good financial standing. A unique situation for Russia is the fact that at least until the COVID-19 pandemic, 43 % of exclave residents continued to buy products covered by the import ban.

The range of ways to purchase "sanctioned" products decreases along the centre-periphery axis. Residents of Kaliningrad and the suburbs buy food products while travelling abroad, from "resellers", in small independent stores. In remote municipalities, there is only one opportunity — buying from "resellers". The closeness to the Polish border predictably plays its role: the frequency of cross-border food shopping trips is higher here than in most other municipalities.

The role of "sanctioned" goods in consumption fully correlates with the region's self-sufficiency in certain items. The lower the self-sufficiency and the deeper the problems in the industry, the higher the importance of Polish goods in consumption. However, a similar thesis applies to products from other regions of Russia and Belarusian products that flooded the market after 2014.

This study shows that, after 2014, before the COVID-19 pandemic, the frequency of cross-border trips was steadily declining due to falling incomes and the depreciation of the ruble. Nevertheless, a third of the Kaliningrad region's residents visited Poland occasionally, shopping for groceries, often combining it with tourist trips.

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EVALUATING THE EFFICIENCY OF THE RESEARCH SECTOR IN RUSSIAN REGIONS: A DYNAMIC DATA ENVELOPMENT ANALYSIS

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The nonparametric method of dynamic data envelopment analysis (DDEA) has become increasingly popular for conducting comparative efficiency evaluations. In recent years, dynamic data envelopment analysis (DDEA), a variant of this method, has gained significant attention. This article applies dynamic analysis to evaluate the efficiency of the research sector in Russian regions. Traditional input variables such as the number of research staff and R&D expenditure are considered, while publication and patent metrics serve as output indicators. The analysis covers a substantial time period, spanning from 2009 to 2020. Notably, the proposed evaluation method incorporates publication quality measures as a carry-over variable, in addition to accumulated R&D expenditure. The study employs dynamic data envelopment analysis to compare the obtained results with previous evaluations of the research and technology sector in Russian regions. The findings demonstrate that the proposed method serves as a valuable ranking technique, enhancing existing evaluations of regions' research and technology potential in terms of efficiency. The article concludes by discussing the prospects and limitations of the method in evaluating and forecasting research and technology profiles of regions.

Introduction

Data envelopment analysis (DEA) spans a wide range of nonparametric methods routinely used for *ranking* study objects according to their production efficiency [1—3]. A comprehensive review of modern types of DEA is the work by Chiang

Kao [4]. This widely used method continues to develop, which is especially true for its dynamic [5] and stochastic [6] applications. In Russian literature, the first studies into the use of DEA appeared at the turn of the 21st century [7—9]. Particularly, the method was employed in comparative efficiency assessments [10—17].

DEA builds on the universal notion of *efficiency* defined as the ratio between outputs and inputs for a certain object. Since it does not presuppose functional dependence between inputs and outputs, this method can be classified as non-parametric. The principal tool of DEA is optimisation. The essence of the method is that it solves as many optimisation problems as there are objects of observation. Moreover, the objective function reflects in one form or another the efficiency of objects, one by one, whilst the system of constraints includes data on all the objects [18]. All the objects are optimally assessed using available data, and this makes it possible to compare the objects, ranking them according to their capacity to transform resources into results.

 A strength of DEA is the possibility to include in the analysis several outputs varying in scale and units of measurement. This makes the method universal: the selection of study objects (for instance, regions) determines the disciplinary area, and the choice of resources and results (for example, research) determines the subject area of the analysis.

This study aims to create a new type of ranking for regional research, using dynamic DEA as a comparative efficiency assessment method.

DEA has gained wide acceptance in regional studies as a well-established research method for the multi-factor comparison of regions [19]. It is also extensively used in assessing technological capabilities within selected industries [20; 21]. Following several earlier studies [22—25], we employ DEA to assess the efficiency of regions in terms of research and technology. The two latter publications are based on Russian regional data allows comparing the findings.

We view DEA as an approach to evaluate the efficiency of objects' performance, as we do regression analysis, the index method and stochastic production frontier analysis. The results of such evaluations, as a rule, underpin guidelines for increasing the efficiency of objects' performance and help identify inefficient objects of systems at macro-, meso- and micro-levels by building the so-called 'efficient frontier' determined by the performance of the most effective objects from the array. The method can also be employed in analysing the influence of various territory-specific factors that are at odds with the characteristics of the regional system. For instance, this can be done to assess the efficiency of regional research and education systems [26], the energy sector [27], environmental management systems [28], and innovative production [29]. DEA does not focus on processes within the system but aids in analysing inputs and outputs, as well as providing recommendations on optimizing them to increase the system's efficiency [30].

Using DEA to study the system of knowledge production offers helps make informed personnel and financial decisions at a regional level to ensure the effi-

ciency of the innovative system. As mentioned above, the usual result of employing DEA is an analysis of deviations from the efficient frontier in the performance of some objects and recommendations for improving their efficiency.

Following the target-setting method, Svetlana Ratner [31] proposes calculating projections for the inefficient objects of regional systems within the space of inputs and outputs on the efficiency frontier. This would make it possible to determine input reduction and output increase targets, thus ensuring the object's efficiency. Window analysis has been employed for the dynamic assessment of objects' efficiency. This method involves selecting an observation window of a certain length for each production facility, which ensures the robustness of efficiency assessment and reveals trends in efficiency. Olga Komarevtseva [32] uses DEA to assess the intensity of the link between the financial and social efficiency of municipalities in the Orel region. The methods can also be employed to assess the efficiency of organizations, using financial indicators of financial and economic performance rather than focusing solely on the amount of resources expended or outputs [33]. Aliya Alimkhanova and Artur Mitsel emphasise the applicability of DEA to assessing efficiency regardless of the combination of resources and rank objects according to efficiency. Therefore, inefficient objects can be identified and recommendations produced for improving their efficiency.

The method helps describe the states of efficiency and changes in it, which are not often predetermined by the amount of resources in regions. A great strength of DEA is that its results often challenge the stereotypes about how well regions can fare in research and technology. Yet, these results are to be taken with a grain of salt as they heavily depend on the quality of the data. For example, if regional statistics systematically misrepresent the amount of expenditure or personnel capacity in a region, the resultant assessment may be incorrect.

Overall, the methodological problems of DEA are a by-product of its advantages. Firstly, DEA is very sensitive to data quality, including outliers, sudden shifts, and other factors. Secondly, the traditional tools of statistical assessment of results are not applicable to the classical variation of DEA. However, the literature has described some approaches to address this problem (see [6]). Therefore, if it is necessary to take into account the randomness of data evaluation, alternative classes of models should be used such as stochastic frontier analysis (SFA; see [1; 34]).

The structure of this article takes the following form. It begins with a characteristic of the *dynamic* model employed, which builds on the ideas of Chen et al. developed in [22]. Then follows a description of data on research[1] conducted in Russian regions in 2009—2020, which are used along with publishing perfor-

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[1] We use the term 'research' since we use as the input variables the number of publications and patent applications. We do not, however, evaluate economic inputs that can shed light on the condition of the fields of research and technology and/or innovations.

mance data, 2008 internal R&D expenses figures and patent statistics since 2007. Further, cut-off values are given that were used when forming the final sample of regions. The next section contains the main results of the calculations and offers their visualisation, comparing them to earlier data. Discussion and conclusions round off the article.

Dynamic DEA model

DEA is used to assess *efficiency* defined as the *ratio* between effects (results) to resources expended. Within DEA, efficiency assumes, as a rule, the form of *technical efficiency*, i. e., the ratio between the optimal amount of necessary resources per unit of output and resources actually expended (for more detail, see [1]).

When using DEA, the optimisation problem can be viewed as the primal or dual problem, i. e. based on an envelope or a multiplier. We use a *dynamic* model [18; 22], which, in turn, is a modification of the relational analysis model proposed by Kao [18], who adheres to the multiplier form. And we will do the same.

So, n objects of observation (regions) are given, for which panel data have been collected for T periods and three groups of variables: inputs Y_r, outputs X_i and carry-over (transitioning from one period to another), Z_p. In the context of dynamic DEA, particular attention should be paid to carry-over variables Z_p (Fig. 1) since, without them, the model would be a simple aggregate of T statical models.
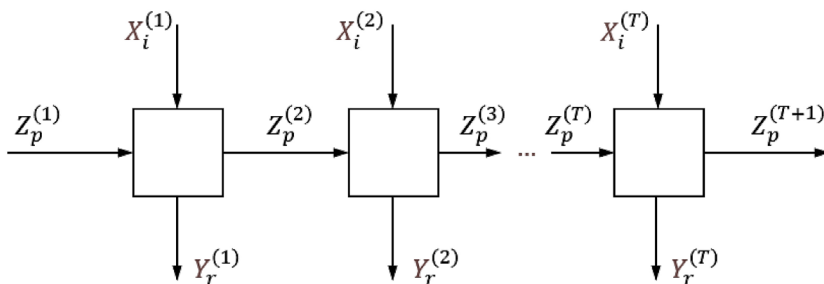
Fig. 1. The principal scheme of dynamic DEA (adopted from [22, p. 107])

The scheme considers one variable of each type for one object of observation. Extending this scheme to all the objects requires collating *panel* data, which will be described in the next section, carry-over variable should be collected for $T+1$ periods.

Unfortunately, matrix notation is not suitable for the description of this problem, and thus the cumbersome index notation is used. The problem of maximising individual efficiency can be expressed as follows:

$$\max E_k = \frac{\sum_{t=1}^{T}\sum_{r=1}^{s} u_r Y_{rk}^{(t)} + \sum_{t=1}^{T}\sum_{p=1}^{q} w_p Z_{pk}^{(t+1)}}{\sum_{t=1}^{T}\sum_{i=1}^{m} v_i X_{ik}^{(t)} + \sum_{t=1}^{T}\sum_{p=1}^{q} w_p Z_{pk}^{(t)}}$$

$$s.t. \quad \frac{\sum_{t=1}^{T}\sum_{r=1}^{s} u_r Y_{rj}^{(t)} + \sum_{t=1}^{T}\sum_{p=1}^{q} w_p Z_{pj}^{(t+1)}}{\sum_{t=1}^{T}\sum_{i=1}^{m} v_i X_{ij}^{(t)} + \sum_{t=1}^{T}\sum_{p=1}^{q} w_p Z_{pj}^{(t)}} \le 1, \quad j = 1,2,\dots,n$$

$$\frac{\sum_{r=1}^{s} u_r Y_{rj}^{(t)} + \sum_{p=1}^{q} w_p Z_{pj}^{(t+1)}}{\sum_{i=1}^{m} v_i X_{ij}^{(t)} + \sum_{p=1}^{q} w_p Z_{pj}^{(t)}} \le 1, \quad j = 1,2,\dots,n; \quad t = 1,2,\dots,T$$

$$u_r, v_i, w_p \ge \varepsilon.$$

Optimisation occurs over positive multipliers u_r, v_i, w_p, with ε being some small positive value. Looking ahead, we will consider six multipliers: two per each groups of variables. Optimisation will result in six sets of multipliers. Multipliers do not change across periods.

As can be seen, the maximum value of the objective function (the first expression, E_k) is the indicator of interest, i.e. that of the efficiency of some object k from a set n. The expression of the objective function differs from the first group of constraints (n each) only in that the index j replaces the index k, where $j = 1, 2, \dots, n$. This means that we have to solve a *separate* problem form each k, with the restriction imposed that the efficiency of no object from the group can exceed one.[1]

Finally, there is the second group of $n \times T$ constraints. The expression for it differs from that for the previous one in that it lacks external summation over T (in our case, there will be 804 such constraints for each k). To ensure a more efficient numerical solution, the expressions in the model are modified in such a way as to remove cumbersome ratios (see [18, p. 327]). Since efficiency is a ratio, the denominator can be normalised to 1.

By expressing the numerators and denominators from the second group of constraints as $B = \sum_{r=1}^{S} u_r Y_{rj}^{(t)} + \sum_{p=1}^{q} w_p Z_{pj}^{(t+1)}$ and $A = \sum_{i=1}^{(m)} v_i X_{ij}^{(t)} + \sum_{p=1}^{q} w_p Z_{pj}^{(t)}$, a simplified scheme of the problem can be written as follows[2]:

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[1] Here is a subtle point: depending on whether the constraint on k is included in the group of constraints, the models will differ slightly. If it is not, efficiency can be above 1 numerically, which is indicative of superefficiency (for more detail, see [1]). This article considers a version without superefficiency.

[2] The problem has two variants: import-oriented, as is the case here, and export-oriented. To distinguish between them in practice, one should pay attention to the range in which the result falls. If the results of the objective function is $0 < \theta \le 1$, one is dealing with the import-oriented version; if $\varphi > 1$, export-oriented. Since, in the general case, it is required that $\varphi\theta = 1$, we will not consider this in detail [3].

$$\max \sum B$$

$$\sum A = 1$$

$$\sum B \le \sum A, \quad j = 1, 2, \ldots, n$$

$$B \le A, j = 1, 2, \ldots, n; \quad t = 1, 2, \ldots, T$$

$$u_r, v_i, w_p \ge \varepsilon.$$

In this representation, summation is conducted over T and t-th indices are omitted for simplicity. This simplified scheme is implemented using the Wolfram functional programming (Appendix).

Data

We collected data on traditional indicators for research. The data on Russian regions are for 2008—2021, with the first and last periods reserved for averaging the research indicators and creating carry-over variables. Therefore, $T = 12$ in the model, i. e., it spans the period from 2009 to 2020.

As resource indicators, or inputs, we used statistical data found in the annual books *Regiony Rossii. Sotsialno-ekonomicheskie pokazateli* [Russian regions. Socioeconomic indicators]:[1]

1. The number of R&D personnel. This metric covers various categories of people employed in the field rather than researchers only, since such an approach is more suitable for efficiency assessment.

2. Internal R&D expenses. All the evaluations, which are based on the regional consumer price index, are normalised to 2010 values.

Resulting indicators (outputs):

1. The number of publications covers research works of all types from the years 2010—2021, indexed in Scopus [5]. It is shifted one period forward since, by convention, there is a time lag of one to three years between expenditure and publication [35].

2. The number of patent applications filed. The statistics on Russian regions are according to Rospatent.[2] The values were averaged over three years as this metric is characterised by sudden annual shifts. In contrast with publication metrics, here we assume that patent applications are filed during its preparation period.[3]

[1] Regiony Rossii. Sotsialno-ekonomicheskie pokazateli [Russian regions. Socioeconomic indicators], 2021, *Rossstat*, URL: https://rosstat.gov.ru/folder/210/document/13204 (accessed 02.09.2022).

[2] Godovye otchety [Annual reports], 2021, *Rospatent*, URL: https://rospatent.gov.ru/ru/about/reports) (accessed 02.09.2022).

[3] We consider patent applications rather than patents, as the preparation of the former is, as a rule, a laborious task regardless of whether they are granted. From the perspective of productive output of research, patent applications are a close substitute for research articles.

The Scopus database by Elsevier was chosen as a source of bibliometric data. Publications' metadata include the affiliation of all authors, making it possible to distribute the array of Russian publications by region. The data were aggregated for Russia's 78 regions and federal cities.[1]

Aggregation was carried out using the full counting method [36]: a publication co-authored by researchers from different regions gives each region a credit. Thus, it was necessary, firstly, to include publications from organisations with a validated Scopus profile into a regional set and, secondly, to search for publications from organisations with such a profile and add them to the corresponding regional sets.

Finally, as carry-over variables, the model used:

— accumulated expenses calculated by aggregating the shares of internal R&D expenses in 2008—2020;

— Scopus field-weighted citation impact (FWCI) of publications for 2009—2021. It is the ratio of citations to the expected worldwide average for the field, type and publication year.[2] A FWCI of 1 means that the citation impact of a work is exactly the global average. We smooth this metric for two consecutive periods.

It has been proposed in the literature to use variables associated with stocks, typically capital stocks, as carry-overs. Statistics of this nature, as is known, are difficult to collect when it comes to research and technology. However, period-wise accumulated internal expenses seem to be a good proxy indicator [22]. In our model, we capitalise 5 % of such R&D expenses annually[3] and use a 20 % depreciation rate.

Citation impact gives insight into one of the aspects of academic publishing quality. We assume that research is closely bound up with the accumulation of experience, which in turn has a bearing on the quality of findings. The accumulated number of publications is, on the one hand, a result of research and, on the other, an input resource to obtain new research results. One of the indicators of academic publishing quality is the FWCI. The indicator is normalised in such a way as to not require taking logarithms.

Since regions differ in scale, it seems reasonable to take *logarithms* of the main variables to obtain comparable time series. Although the final rankings are different between initial and logarithmic data, the logarithmic expression gives a smoother picture with a smaller spread in efficiency by year.

[1] This is a result of consolidating data on the Khanty-Mansi autonomous region and the Yamal-Nenets autonomous region, the Nenets autonomous region and the Arkhangelsk region,as well as the exclusion of the Jewish autonomous region, the Chukotka autonomous region, Crimea and Sevastopol due to a lack of data covering the study period.

[2] What is Field-weighted Citation Impact (FWCI)?, 2022, Elsevier, URL: https://service.elsevier.com/app/answers/detail/a_id/14894/supporthub/scopus/~/what-is-field-weighted-citation-impact-%28fwci%29%3F/ (accessed 02.09.2022).

[3] It is a gross simplification, but, since the available statistical database is not exhaustive, it is impossible to demonstrate changes for each indicator and each region.

Figure 2 shows smoothed indicators and their symbolic representations. As can be seen, it is impossible to make any conclusion by visual inspection alone. Moreover, there is more than one indicator for each period in the model. This calls for automatic evaluation methods, such as dynamic DEA; the next section will reveal the results of its application.
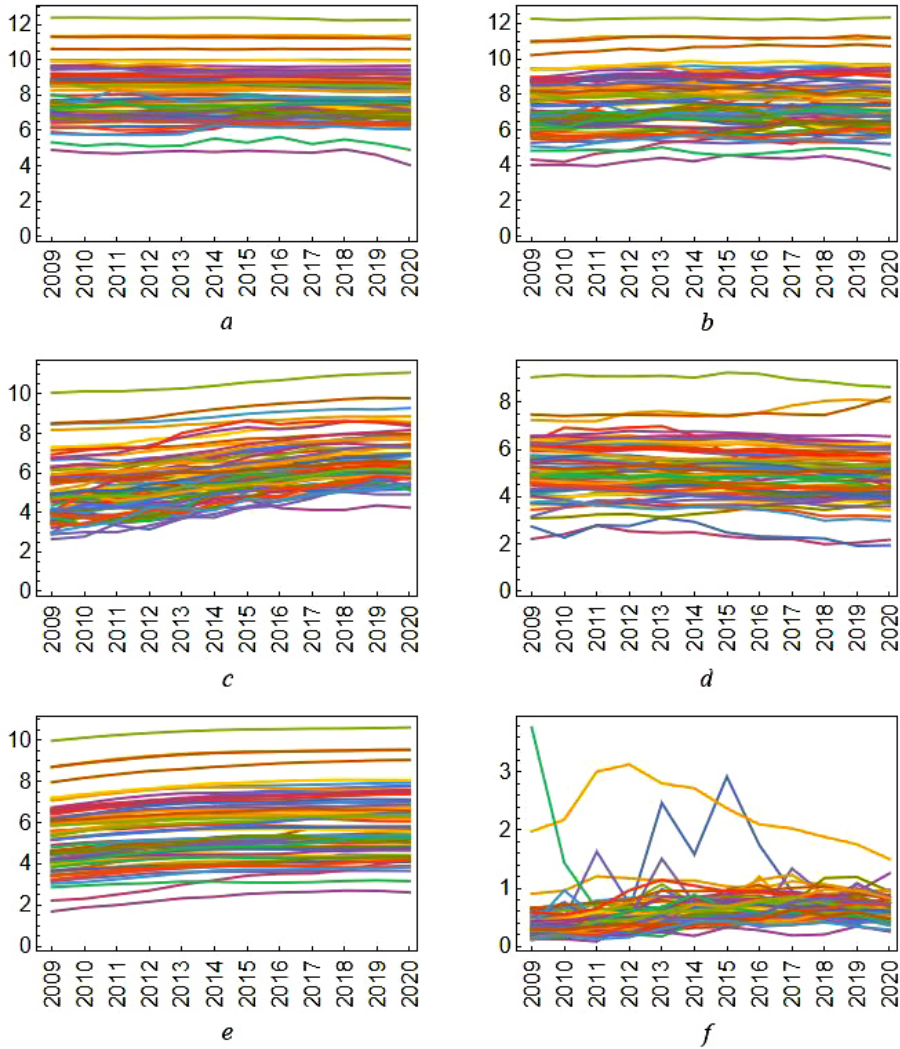
Fig. 2. Changes in model data: a — the logarithm of R&D personnel number, X_1;
b — the logarithm of internal R&D expenses, X_2;
c — the logarithm of Scopus-indexed publication number, Y_1;
d — the logarithm of three-year averaged number of patents, Y_2;
e — the logarithm of accumulated data at the end of a period, Z_1;
f — two-year averaged FWCI at the end of a period, Z_2

Source: calculated by the authors based on data from Rosstat, Rospatent and Scopus.

Table 1 shows statistical characteristics of the data.

Table 1

Main statistics based on the available data for the panel *n* = 67, *T* = 12, in logarithmic form, except for Z_2

Symbol	Mean	Standard deviation	Minimum	Quantile 0.25	Median value	Quantile 0.75	Maximum
X_1	7.98	1.44	4.04	6.87	7.77	8.89	12.39
X_2	7.54	1.59	3.82	6.38	7.36	8.57	12.32
Y_1	5.95	1.45	2.64	4.97	5.83	6.74	11.09
Y_2	5.08	1.16	1.92	4.30	5.05	5.78	9.25
Z_1	5.69	1.59	1.69	4.51	5.49	6.72	10.61
Z_2	0.61	0.35	0.08	0.41	0.57	0.72	3.77

Comment: lagged series were used for carry-over variables

For the final ranking, regions with pronounced deviations in the data were excluded from the sample (for example, those with very low publication or patent activity).[1] The final number of regions was *n* = 67.

Results

In basic form, the solution of the optimisation problem, using a Mathematic package, returns indicators of efficiency and corresponding overall ranking shown in Table 2. Columns 5 and 6 demonstrate, for reference purposes, ranking results obtained in earlier works [19; 25].

Table 2

Results of efficiency assessment of regional research, *n* = 67

Region	Code	Our calculation		For reference	
		Efficiency in 2009—2022	Rank	RIS efficiency, 1998—2012	HSE's Russian Regional Innovation Ranking 2018
1	2	3	4	5	6
Ivanovo region	IVA	0.988	1	7	11
Kostroma region	KOS	0.974	2	3	71
Kemerovo region	KEM	0.967	3	20	22

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[1] A region was excluded from analysis if, during a least one period, there were fewer than ten publications and five patent applications.

The continuation of the Table 2

Region	Code	Our calculation		For reference	
		Efficiency in 2009—2022	Rank	RIS efficiency, 1998—2012	HSE's Russian Regional Innovation Ranking 2018
1	2	3	4	5	6
Republic of Mariy El	ME	0.964	4	15	8
Novosibirsk region	NVS	0.964	5	10	10
Tomsk region	TOM	0.963	6	4	1
Belgorod region	BEL	0.960	7	43	19
Moscow	MOW	0.960	8	1	6
Lipetsk region	LIP	0.959	9	2	59
Arkhangelsk region	ARK	0.959	10	63	49
Republic of Tatarstan	TA	0.957	11	17	17
Krasnoyarsk Krai	KYA	0.957	12	39	15
St. Petersburg	SPE	0.953	13	5	4
Primorski Krai	PRI	0.953	14	53	23
Irkutsk region	IRK	0.953	15	52	21
Republic of Bashkortostan	BA	0.950	16	14	9
Sverdlovsk region	SVE	0.949	17	28	12
Volgograd region	VGG	0.946	18	44	67
Khabarovsk Krai	KHA	0.946	19	48	56
Saratov region	SAR	0.945	20	41	42
Moscow region	MOS	0.945	21	6	7
Rostov region	ROS	0.945	22	35	25
Republic of Dagestan	DA	0.942	23	33	60
Republic of Karelia	KR	0.942	24	62	30
Republic of Udmurtia	UD	0.941	25	31	63
Vologda region	VLG	0.941	26	12	36
Perm Krai	PER	0.941	27	16	18
Samara region	SAM	0.941	28	27	48
Tyumen region	TYU	0.940	29	23	3

The continuation of the Table 2

Region	Code	Our calculation		For reference	
		Efficiency in 2009—2022	Rank	RIS efficiency, 1998—2012	HSE's Russian Regional Innovation Ranking 2018
1	2	3	4	5	6
Republic of Chuvashia	CU	0.940	30	30	61
Republic of North Ossetia-Alania	SE	0.939	31	22	76
Republic of Sakha (Yakutia)	SA	0.939	32	58	54
Republic of Buryatiya	BU	0.938	33	64	50
Orenburg region	ORE	0.937	34	36	52
Stavropol Krai	STA	0.937	35	47	58
Karachai-Cherkess Republic	KC	0.937	36	66	62
Nizhny Novgorod region	NIZ	0.937	37	19	5
Altai Krai	ALT	0.937	38	38	39
Chelyabinsk region	CHE	0.936	39	18	28
Kabardino-Balkarian republic	KB	0.936	40	56	66
Krasnodar Krai	KDA	0.936	41	9	47
Kursk region	KRS	0.936	42	26	51
Omsk region	OMS	0.935	43	37	16
Ulyanovsk region	ULY	0.935	44	11	2
Voronezh region	VOR	0.935	45	8	33
Amur region	AMU	0.934	46	50	73
Kaliningrad region	KGD	0.934	47	55	38
Murmansk region	MUR	0.934	48	65	53
Orel region	ORL	0.934	49	13	37
Leningrad region	LEN	0.933	50	45	57
Tula region	TUL	0.931	51	24	65
Republic of Komi	KO	0.931	52	61	20
Transbaikal Krai	ZAB	0.930	53	57	72
Astrakhan region	AST	0.930	54	51	77
Novgorod region	NGR	0.930	55	54	14

The end of Table 2

Region	Code	Our calculation		For reference	
		Efficiency in 2009—2022	Rank	RIS efficiency, 1998—2012	HSE's Russian Regional Innovation Ranking 2018
1	2	3	4	5	6
Tambov region	TAM	0.930	56	42	79
Smolensk region	SMO	0.929	57	60	34
Republic of Mordovia	MO	0.929	58	59	69
Bryansk region	BRY	0.929	59	49	32
Yaroslavl region	YAR	0.928	60	34	26
Penza region	PNZ	0.927	61	40	45
Tver region	TVE	0.924	62	32	27
Kaluga region	KLU	0.924	63	29	13
Kamchatka Krai	KAM	0.923	64	67	41
Vladimir region	VLA	0.923	65	46	31
Kurgan region	KGN	0.921	66	25	80
Ryazan region	RYA	0.921	67	21	46

Comment: in column 5, the last two ranks were added because of the difference in the samples; in column 6, there are gaps in the ranks since our study covers fewer regions.

As Table 2 shows, the results of ranking by efficiency differ greatly from each other and those in column 6, which demonstrated innovation ranking results (19, p. 38—39). This might point to the fact that the link between capacity for innovation and efficiency is rather tenuous: indeed, the former does not necessarily entail the latter, and vice versa.

Figure 3 gives a visual representation of period-wise changes in efficiency. Despite the absence of a steady trend, the efficiency was in the range of 0.9 to 1.0, which is very much in line with the original study [22].

As can be seen, for a large group of regions, the indicator slightly decreased in the first half of the study decade, when the policy to encourage publication activities was introduced [37]. Later, the values grew slowly. The barely visible deceleration towards the end of the study period may be a result of the saturation and exhaustion of opportunities for the extensive growth of publication activities.

One of the most recent publications assessing the efficiency of the Russian region's innovation systems is the contribution by Stepan Zemtsov and Maxim Kotsemir [25]. They examined the period between 1998 and 2012, which we consider only partially, and focused on assessing regional innovations and advances and technology, whilst we concentrate on research. These two areas, however, are closely linked and thus the findings of the two studies may prove comparable.
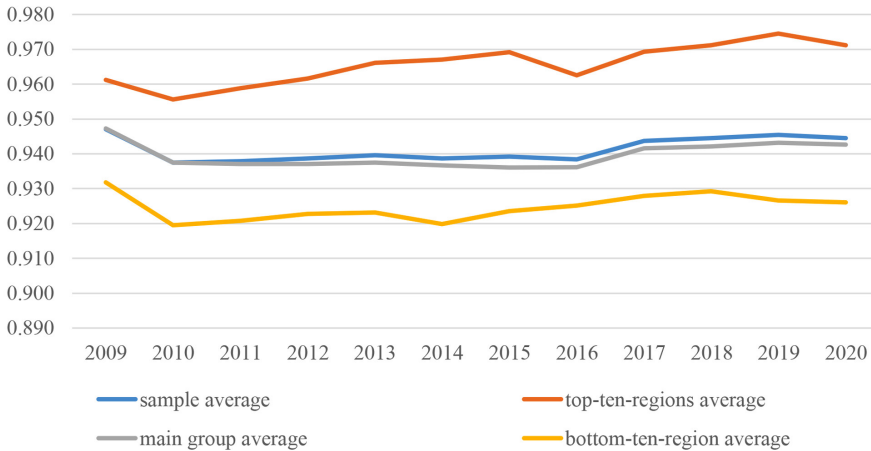
Fig. 3. Changes in the calculated indicators over the study period ($n = 67$)

Overall, there is a statistically significant but weak correlation of 0.39 with the findings of Zemtsov and Kotsemir [25], which may be due to both differences in data and the peculiarities of DEA.

It is worth noting that our calculation has a smaller spread in efficiency values between regions: the difference is 10 %, whilst, the cited work reports an over 20-fold difference between the best and worst-performing regions. Since we examine a narrower range of resources and only nonmonetary results, a slight difference in efficiency might be expected.

Another important difference is that, in the earlier work [25], Moscow is the leader by far, providing a benchmark for comparison. But, according to our calculations, Moscow is not the absolute leader in efficiency despite the considerable increase in publication activities observed over recent years. This decrease in Moscow's relative efficiency is probably a result of its patent activity declining in the second half of the decade,[1] as well as of the capital accounting for the overwhelming proportion of research funding.

[1] Here, we do not consider the criticism of the patent activity indicator, particularly its national version, since the use of this family of indicators is standard in assessing the research (and innovation) sector.

Discussion and conclusions

This study covers a relatively lengthy period, which is not common in the literature on dynamic DEA. As expected, the model is sensitive to the systematic underreporting of resource indicators at the data level. A prime example of this is the Ivanovo region, which typically scores low on resources but ranks high on research indicators.

As Figure 4 shows, the regions supersaturated with R&D financing have relatively low efficiency. These are the Ulyanovsk, Samara and Tyumen regions, and Krasnoyarsk Krai, well-resourced but far from excelling.
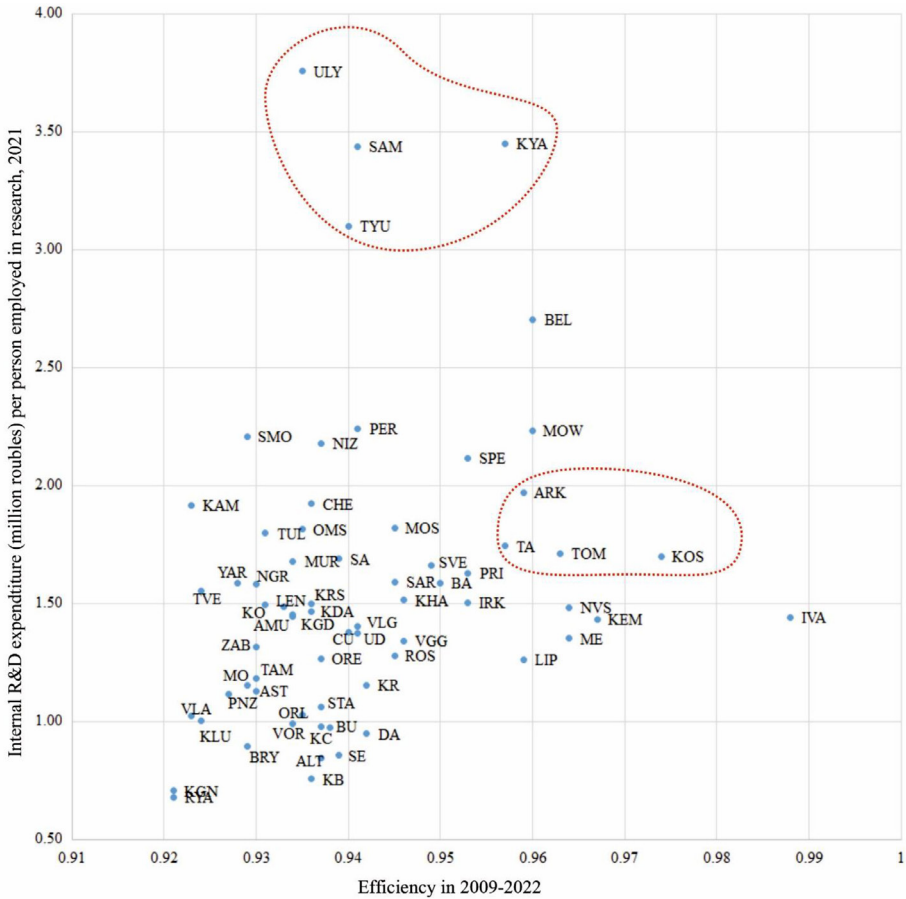

Fig. 4. Correlation between R&D expenses and efficiency in Russian regions

On the other hand, Tomsk and Novosibirsk are ranked as leaders despite relatively generous funding. According to our calculation, Moscow is not the ab-

solute leader, albeit ranked in top ten. This is yet another proof that efficiency is a *relative* indicator, and leadership in absolute values does not mean using the available resources to the fullest.

The opposite situation is also possible, especially when the resource allocation system overrelies on the 'achievement principle'. For example, in the dynamic model (unlike the one described in [24]), the Kaliningrad region is ranked rather low in terms of research efficiency, despite a relatively high effectiveness growth rate.[1] This can be explained by the effect of the border region in a unique geopolitical position receiving substantial research funding.

On average, including in the model carry-over variables increases the efficiency indicators [22]: the distribution of indicators is comparable to that reported in the original study using our own and Kao's methodology [18]. In Chen et al. [22], the overall efficiency is above 0.9 for all the study regions. In this study, period-wise results (the technical efficiency indicators) also vary between 0.9—1.0.

In general, dynamic DEA yields tangible results and is convenient to use. But we identified the model's heightened sensitivity to expressing the indicators in the logarithmic form (see also [38]). It is also sensitive to changes in the expenses carry-over variable (in this case, it is a 5 % per cent share of internal R&D expense and 20 % depreciation). The model reacts less strongly to the quality variable of FWCI in the overall ranking (the citation impact mostly contributes to the accuracy of the efficiency indicator).

Dynamic DEA seems promising in assessing and comparing the efficiency of regional research. Yet, as in any other case, the ranking must be treated critically and the methodology supplemented with analytical statistics [19]. An important finding of this study is that capacity for innovation and efficiency may be weakly linked. Therefore, capacity-based rankings should be supplemented with efficiency assessments, including those using DEA.

In further research, we will consider the possibility of comparing and combining the results obtained by different methods, such as SFA or the complexity index, in order to rank and cluster regions, using the collected data.

Appendix

Surprisingly, software implementations of dynamic DEA are rare despite the wide selection of libraries modelling static DEA. An exception is the library created based on [5].

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[1] Following the established practice, we distinguish between efficiency and effectiveness: the former describes the ratio between effects and costs and the latter between the actual and expected effects.

We propose a short code implementation in the Mathematica package, whose functional programming and built-in optimisation functions seem to be adequate for solving the problem.

The minimum code necessary for solving the problem is neither optimised nor suited for scaling: rather, its purpose is to give an accurate picture of a simplified version of the problem.

Having initial data, it is possible to derive several variables:

```
VARS = {u1, u2, v1, v2, w1, w2};
{U1, U2, V1, V2, W1, W2} = ConstantArray[#, {n, T}] & /@ VARS;
OUT = U1 * Y1 + U2 * Y2 + W1 * Z1T + W2 * Z2T;
INS = V1 * X1 + V2 * X2 + W1 * Z1 + W2 * Z2;
```

VARS contains a list of symbolic variables for optimisation. The other rows include symbols for matrices of size $n \times T$ filled with symbols and data. U1, U2, V1, V2, W1, W2 are filled with symbols u1, u2, v1, v2, w1, w2 respectively.

Y1, Y2, X1, X2, Z1, Z2, Z1T, Z2T are filled with numerical values (data).

When forming OUT and INS matrices, the * operator means the element-wise product, i.e., Hadamard rather than the matrix product.

The main procedure is as follows:

```
NMaximize[
    Flatten[{
    Part[ (Total /@ OUT), #],
    Part[ (Total /@ INS), #] == 1,
    Thread[ (Total /@ OUT) < = (Total /@INS)],
    Thread / @Thread[OUT < = INS],
    Thread[ VARS > 0 ]
    }],
    VARS] & /@Range[n]
```

Let us comment on this procedure. In Mathematica, all expressions are contained in lists held by curly brackets {}. For example, the VARS variable includes a list of symbols. The matrix is a list comprising several other lists (rows). Functions take brackets []. Elements in lists and functions are separated by commas.

The notation (Total /@ OUT) for the OUT matrix means summation on rows (in effect, we apply the Total function to each row of the matrix; this operation is represented by an operator of the /@ form. Since OUT has size $n \times T$, summation on rows is the summation over time. The same holds true for INS.

The Part[] function, as its name suggests, highlights a part of the list. For instance, the expression Part[{a, b, c}, 2] will return the second value of b from the list {a, b, c}.

The Thread[] function is auxiliary. An example of the way it works is the expression Thread[VARS > 0], which would return the list of inequalities:

$\{u1 > 0, u2 > 0, v1 > 0, v2 > 0, w1 > 0, w2 > 0\}$.

As its name implies, this function 'sews together' lists of symbols making them lists of expressions. The Flatten[] function removes unnecessary brackets and forms a list with an objective function and constraints, a list that can be processed with the numerical optimisation procedure NMaximize.

Finally, the principal procedure NMaximize[… # …]&/@ Range[n] carries out numerical maximisation with respect to numbers from 1 to n, each number inserted instead of the symbol #. The # symbol stands for a pure variable, always accompanied by the symbol &. In this case, the values substituted for # form Range[]. For example, Range[4] will return a list with the values {1, 2, 3, 4}. Again, the operator /@ means that these values have to be substituted *one by one* but not all at once. This way, *n* optimisation problems are consecutively solved.

The results obtained through this procedure can usually be saved and worked upon later, but we leave this part out for concision. For more detail, see [39].

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EFFICIENCY ANALYSIS OF SEAPORTS IN RUSSIA'S BALTIC BASIN: PERFORMANCE EVALUATION

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This research presents a comprehensive analysis of the performance efficiency of Russia's Baltic seaports, taking into account various economic indicators and addressing investment planning and management issues. Special attention is given to the sustainable development goals and objectives of the seaports, considering their significance in transport and logistics systems. The primary objective of this work is to develop a system approach for conducting multi-criteria studies on seaport performance efficiency. The findings obtained through the proposed methodology consider criteria at different levels of seaport management, offering valuable practical implications. Notably, this study fills a gap in the literature as no previous work has provided a comprehensive methodology for studying and analyzing ports from the perspectives of management, logistics, and macroeconomics. The system approach can also incorporate environmental considerations and innovative solutions in port infrastructure management. By proposing a new approach to interpreting statistics on Baltic seaports' performance and presenting empirical research on sustainable development in transport and logistics systems, this study enables a multidimensional examination of seaport performance and establishes a framework for efficiency analysis and evaluation, which is crucial for effective management. The methodological scheme and algorithm for analyzing different categories of managers further facilitate the practical application of the approach. Moreover, it can serve as a strategic tool for informing regional economic policies regarding logistics and transportation.

Keywords:

seaport, Baltic region, efficiency, performance indicators, transport logistics, sustainable development, coastal zone

Introduction

The need to apply new technologies to solve classical management tasks is driven by the accelerated pace of digitization of individual functions and processes, economic globalization, geopolitical transformation [1; 2], the emergence of new socio-political problems, the imbalance between existing and required infrastructure, the increasing share of transportation costs in the overall structure of logistics expenses, and other factors. However, focusing solely on optimizing operational activities does not seem sufficiently convincing from the long-term perspective of development. Research on companies engaged in various transport and logistics operations has revealed a lack of attention to the analysis and evaluation of performance from a strategic management standpoint. While significant research has been dedicated to other strategically important aspects such as designing logistics systems, planning performance indicators, and forecasting demand and supply, the analysis of effectiveness is often treated as a secondary element of management, which, in our opinion, is a misconception. On the contrary, regular monitoring and evaluation of transport and logistics activities are essential [3]. Experts [4; 5] suggest that a high level of analysis accuracy promotes rational resource management and enables timely corrective actions.

The study of both domestic and foreign literature, including the examples provided in these sources [3; 6], has led to the recognition of the significant scientific and practical interest in adopting a systemic approach to analyze port activities using multiple criteria. This interest stems from the recognition of the maritime coastline's substantial resource and communication potential within the complex geopolitical environment of the modern world, characterized by escalating tensions in various regions of Russia (such as Crimea, the Kuril Islands, and the Arctic). In this context, the analysis and evaluation of port activities as a vital component of the transport and logistics system hold strategic importance for regional development and the nation as a whole. Maritime ports play a pivotal role in global trade, which is an integral aspect of globalization and the establishment of regional trade agreements [7]. In addition to considering purely economic aspects in the analysis of port activities, it is important to take into account a whole range of additional factors, which are most fully examined in the context of the concept of 'territorial capacity'. Under this term, specialists [8] understand the possibility of intensifying the use of existing resources (infrastructure, nature, human resources, recreational, etc.) with or without investment planning, aimed at the comprehensive development of the territory and increasing the efficiency of port activity.

In the work [9], it is noted that since the 2000s, maritime transport has played a decisive role, accounting for up to 60% of all cargo transportation in conducting export-import operations. The significance of the effective functioning of a port as a connecting element in the organization of export-import operations, enabling the growth of various sectors of the economy, has long been recognized. As mentioned in the study [10], the "maritime factor," traditionally considered in the context of various aspects, is an important component of continuity in the development experience and comprehensive exploitation of the coastal territory. It includes characteristics such as economic and infrastructural facilities, the maturity of port structures and their significance at the national level, the rational use of maritime resources, their accessibility, and others.

Therefore, in order to enhance the competitiveness of the national trade system at the international level, special attention should be paid to the efficient operation of seaports. Furthermore, ports perform a complex of logistical operations that add value (such as packaging, consolidation, cargo storage, etc.). It should be noted that the level of development of the region's transport and logistics infrastructure directly affects the efficient operation of a seaport, which serves as a transportation hub where various modes of transportation such as road, rail, and maritime interact. The work [11] highlights that the efficient organization of a seaport as a transportation hub, connecting the inland logistics infrastructure and maritime routes, can achieve the goal of minimizing transportation costs and promoting sustainable development (including reducing carbon footprint). The high practical significance of a systematic study of a seaport demonstrates its relevance in the case of countries in the Caribbean Basin [12], China [11], ports along the transportation corridor under the Chinese government's "One Belt, One Road" initiative [6], and others. Considering various aspects when analyzing the activities of a seaport as a significant element of the transport and logistics system allows for the evaluation of its efficiency according to multiple criteria and facilitates the systematic resolution of strategic-level problems as well as the improvement of operational activities.

The aforementioned considerations have led to the formulation of the research objective, which is to develop a systemic approach for analyzing the effectiveness of seaport operations using multiple criteria. To accomplish this objective, a set of research tasks has been identified and defined: to determine a set of priority methods of scientific cognition (analysis, synthesis, generalization, and modelling); to justify the need for further developments in the research topic (by identifying research gaps in existing scientific research); to conduct a content analysis of statistical data sources; to propose a methodology that considers criteria for different levels of port management; to indicate the possibility for practical application of the developed solution.

Ports of the Baltic Basin of the Russian Federation

Maritime ports hold immense importance for the Russian Federation, as highlighted in the Strategy for the Development of the Russian Seaport Infrastructure until 2030. This strategic plan aims to enhance various aspects of the port industry, including capacity expansion, improved governance, increased competitiveness, and ensuring safe and sustainable development. The successful implementation of this strategy is anticipated to yield significant outcomes such as fostering innovation within Russian ports, mitigating adverse environmental effects, and establishing state-of-the-art port infrastructure.

Nowadays, five sea basins have been identified in the Russian Federation: the Baltic, Arctic, Far Eastern, Caspian, Azov-Black Sea, where a total of 67 ports operate. According to the Federal Agency for Maritime and River Transport (Morflot), in general, the cargo turnover showed positive dynamics in 2022, with the highest volume of transportation attributed to the ports of the Baltic and Azov-Black Sea basins (Fig. 1).
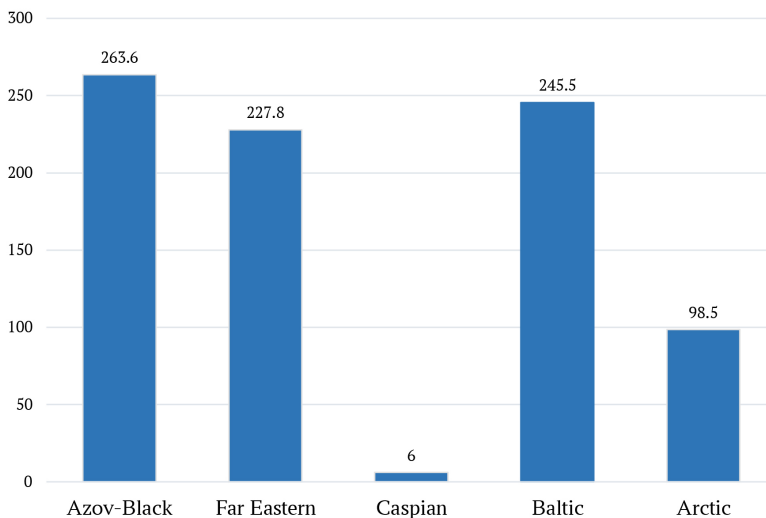
Fig. 1. Cargo turnover of Russian ports by sea basins, 2022, million tons

Source: compiled by the authors according to Portnews.[1]

Within the framework of this research, the ports of the Baltic Basin of Russia will be considered due to their special importance for foreign trade transportation: for example, the majority of cargo transportation from Europe is handled by the ports of the Baltic region. It is worth noting that the Baltic Basin includes ports of the Russian Federation and other countries, while more than half of the cargo flow in the region falls on Russian ports [13] (Fig. 2).

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[1] Cargo turnover of Russian seaports in 2022 increased by 0.7 % to 841.5 million tons, 2023, Portnews, URL: https://portnews.ru/news/341316/ (accessed 13.01.2023).
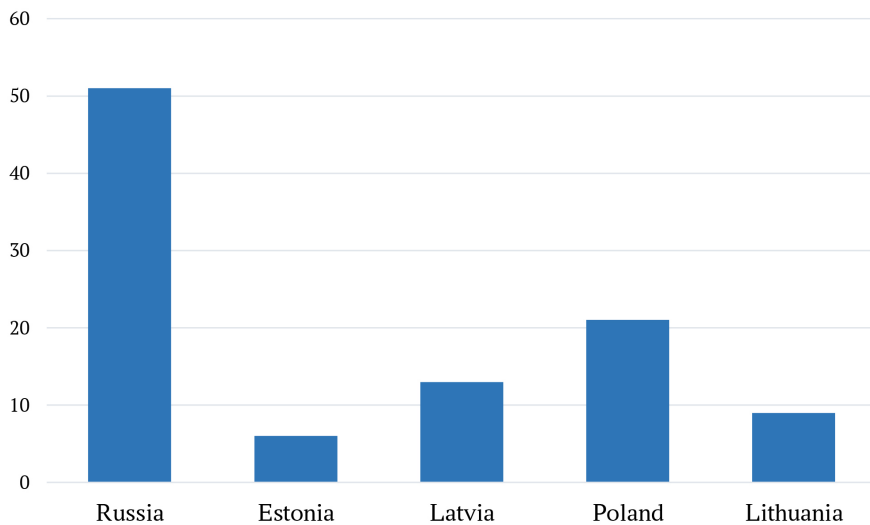
Fig. 2. Distribution of cargo flows in the Baltic seaports
of Central and Eastern Europe by country, 2019, %

Source: compiled by the authors based on data [13, p. 6].

The Baltic Basin of Russia includes the following ports: the Big Port of Saint Petersburg, Vyborg, Vysotsk, Kaliningrad, Primorsk and Ust-Luga. All these ports are located on the territory of the North-Western region of Russia, which has significant transport potential. The region is crossed by two international transport corridors: Corridor № 2 ("East-West") and Corridor № 9 ("North-South"), they are important for the country's economic development [14; 15]. The main idea of the North–South MTK is to create favourable conditions for the delivery of goods from the Middle East to the Baltic states. Goods from the Persian Gulf, India, and Pakistan are transported to the ports of the Northwestern region of Russia and further to their destinations. MTK "East-West" allows cargo to be delivered via the Trans-Siberian railway to the northern ports of Russia, in particular to Murmansk, Arkhangelsk, as well as to the Baltic States and other ports. It is evident that the quality of performing multimodal international transportation through the MTK largely depends on the level of logistic service provided by various components of the logistics system, including the seaport, which serves as a transportation hub that concentrates elements of the logistics infrastructure for efficient and high-quality cargo handling. For example, the Big Port of Saint Petersburg is served by several railway stations, such as Novy Port and Avtovo. On the other hand, ports are of key importance both for regional economic growth and for employment indicators of the region's population. For instance, it is planned that by 2030, the Ust-Luga seaport will create 17,200 jobs, indicating a range of socially significant initiatives beyond solving economic and logistics tasks.

The concept of sustainable development
of the port in the context of the implementation
of transport and logistics activities

It is important to note that studying the problems of the port is impossible without a systematic approach, which includes taking into account a wide variety of factors that have both direct and indirect impacts on its activities. In this regard, the concept of integrated coastal zone management (ICZM) represents a special scientific and practical interest. As mentioned in [8, p. 145], "effective management of the coastal area requires integrating the natural environment and human activities into a single system." The authors [8; 10; 16] emphasize that the comprehensive approach to coastal zone management involves considering various aspects: ecosystem development, use of natural resources to achieve socio-economic development goals and objectives, the existence of conflicts between nature use and other maritime activities, the possibility of human economic activity in the coastal zone, etc. According to foreign experts [17], a comprehensive approach to coastal zone management (and, correspondingly, the elements of the transport and logistics system located within it) should involve close collaboration with government authorities in implementing any initiatives. Referring to the research findings [18], it is worth noting that key environmental issues related to the activities of seaports include water and air quality, noise, and waste disposal. This problem has long been under the close attention of the world community. In particular, the Baltic region is included in the SECA (sulfur compound emission control area), which imposes a ban on the use of marine fuel with a sulfur content of more than 0.1%. This means that using fuel oil, which is the most cost-effective fuel option, is not allowed. As the analysis of sources [19] has shown, today there is an active search for opportunities to manage indicators of sustainable development of the port's activities, taking into account these limitations and the environmental aspect in general. Foreign specialists [20] propose the following metrics for assessing environmental efficiency, which are part of the concept of a "green port": carbon footprint, waste management, and water consumption volumes. The listed indicators are operational; on the other hand, there are also managerial indicators such as an environmental monitoring program, environmental management, environmental training for personnel, and preparation of environmental reports [21]. Managerial indicators pertain to the strategic level of management. Ports that develop strategies to reduce negative environmental impacts and adhere to them can be considered sustainable since their activities enhance the sustainability of transportation and supply chains as a whole [22]. The concept of a sustainable port is relatively new, and various interpretations may be found in the literature. For instance, the American Association of Port Authorities introduced the term "sustainable port" in 2007, which encompasses a set of strategies and actions by the port that meet the current needs of stakeholders, ensure the protection of natural resources, and consider social aspects of personnel management. At the same time, interested parties

may be investors, cargo owners, ship owners, shipping companies, stevedores, the state, ministries, port administration, etc. [23]. On the other hand, European specialists often use the terms 'sustainable' and 'green' port interchangeably, emphasizing that the activities of such a seaport are focused on developing, implementing, and monitoring programmes to reduce environmental impacts [24]. Some differences in understanding these terms can be noted: the concept of a green port focuses on addressing environmental issues, while sustainability concerns problems of an economic, social and environmental nature, which, in our opinion, are most succinctly reflected in the ESG (Environmental, Social, and Governance). There is no exact translation of this foreign term in the domestic literature, but the concept is commonly understood as a combination of "environment," "social sphere," and "management." In some works, in particular, in [25], a quantitative method for evaluating indicators included in the main categories of ESG is proposed. Further development of the issue of assessing the effectiveness of the port's activities, in our opinion, should be developed within the framework of the ESG concept as a tool for a multidimensional vision of the problems of the port's functioning through the prism of a systematic approach to the ICZM.

Methodology for conducting
a comprehensive analysis of the efficiency of ports

The question of analyzing the efficiency of logistical activities in seaports is particularly relevant in light of the modern challenges faced by the Russian economy. Accurate results from performance evaluations of logistics activities in seaports will enable the timely identification of "bottlenecks" and the implementation of appropriate measures to eliminate them. Let us consider in more detail the methodological basis for conducting a comprehensive multidimensional analysis of the activities of the seaport as the most important border transport hub between internal and external trade flows. ISO 9000 states that efficiency is understood as the ratio between the obtained result and the resources used to achieve it. The efficiency of a company's work can be indicated by certain indicators, which can be classified into two types: generalized indicators or particular metrics. The first type includes key performance indicators that allow taking into account total costs, execution time, investment volume, service, and performance indicators [26]. The second group consists of specific indicators related to the performance of operational tasks: port capacity, productivity, customer satisfaction with the provided service (which is reflected in global ratings, for example, in the LPI — Logistics Performance Index calculated by the World Bank), port cargo turnover, and others. As already noted, today the efficiency of port operations is also associated with reducing the carbon footprint. Obviously, from the perspective of applying a comprehensive approach, various port performance indicators should be evaluated according to the level of responsibility of the decisions taken (strategic, tactical, operational) and the time horizon

(short-term, medium-term, long-term). The conceptual approach proposed by the authors of this study implies, at the first stage, identifying all the parties involved in the interaction structure of the seaport and the external environment. This group may include cargo owners, consignees, logistics companies, transportation companies, shipping companies, port administration, investors, government agencies, municipalities, ministries, and others. The efficiency of the port depends on different indicators for each group, so the next step is to determine a set of characteristics suitable for everyone. For example, investors, the government, and port administration assess the efficiency of port activities from the perspective of cargo turnover. Additionally, for the government, the efficiency of the port depends on the use of modern environmentally friendly equipment. From the point of view of cargo owners, the efficiency of the port will be higher if a "smart port" system is implemented in the port. For operators, a high level of efficiency involves following the trend of implementing remote equipment control systems, while employees performing current tasks may face difficulties in mastering new technologies.

On the other hand, the seaport interacts with the participants of the external environment who are not interested in the results of its activities directly, but indirectly influence it. For example, to carry out loading and unloading operations in the port, lifting and transporting equipment is necessary, therefore, the port's activity depends on equipment suppliers, the main criteria for the effectiveness of which are the quality of the equipment supplied, the delivery time and the probability of accurate fulfillment of contractual conditions. In addition, the quality of the provided utility services is crucial for the uninterrupted operation of the seaport.

Another significant aspect concerns the issues of investment planning in determining the amount of funds allocated for the development of digital technologies, modernization of access roads, reconstruction of quay walls, construction of approach channels, or equipment procurement.

Taking into account the above-mentioned aspects, the methodological approach to the analysis of the port's activities, which allows for the consideration of temporal and managerial factors, aspects of investment planning and sustainable development, can be presented in the form of a matrix (Fig. 3).

As seen in Figure 3, efficiency analysis for different management levels is based on different information sources and categories. That is why the suggested approach requires the relevant database about the seaport's performance: financial reports, port schemes, its terminals, etc. Moreover, for the efficient application of the proposed approach, there should be data available about the partners of the seaport in order to define the stakeholders [23]. The complex analysis and further assessment of performance efficiency, in correlation with the conceptual ideas proposed by the authors, can be achieved through several steps (Fig. 4).

Decision-making level		
Strategic	**Tactical**	**Operational**
Time, t →		
Control		
Definition of the stakeholders	Resources: seaport infrastructure	Instructions and technological maps
Strategic goals statement Trans-border cooperation between the companies	Regulations and rules of the seaport activities	Process standardization
	Choice of the development strategy: Cooperation High service level Costs reduction	Current tasks Cooperation with the service providers
	Process definition Task statement: Short-term Sustainable development Increasing customer loyalty Process support (informational, financial, service) Defining the opportunities: resources	Completing logistics operations: Cargo handling operations Cargo consolidation Storage Customs clearance Road maps on applying the new technologies Technology usage
Stakeholders		
Seaport authorities Stakeholders Government Public authorities Ministry	Cargo owner Consignee	Logistics company Transportation company Shipping company

Fig. 3. Matrix of multi-level efficiency performance analysis of the seaport:
characteristics of the steps and levels of realization for different groups of stakeholders

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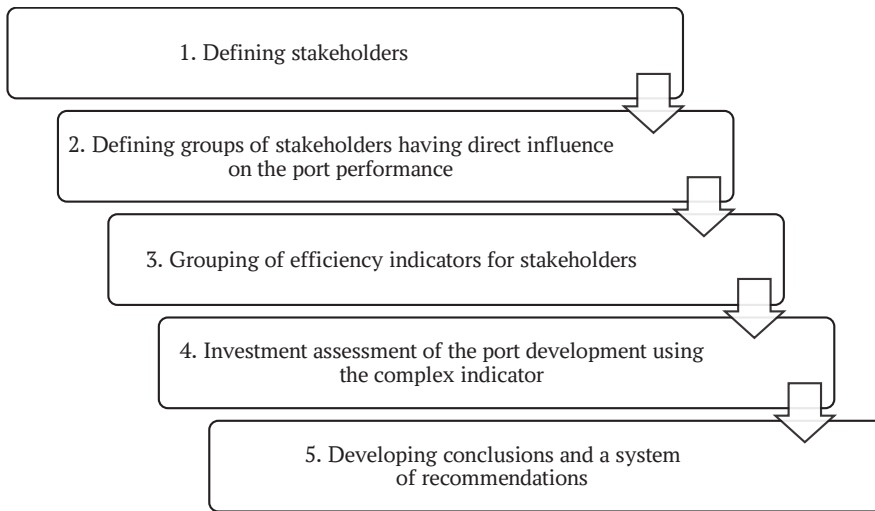
Fig. 4. Algorithm of the efficiency analysis of the seaport

Sequential actions presented in Figure 4 allow concluding that the well-known rules of the systemic approach, such as integration, integrity, decomposition, and hierarchy [27], can contribute to achieving the tasks of complex investigation of the seaports activities, and increase the decision-making quality at all management levels with certain time perspectives. As mentioned earlier, the system approach to the process management investigation has been studied within the ideas of ICZM, where sustainable development is considered from the long-term perceptive of commonwealth governance of economic, political and social factors.[1] In the short term, the perspectives of sustainable development may not be attractive, whereas in the long term, the situation is quite the opposite. This emphasizes the need of concentrating the attempts on considering different aspects of the ICZM with sustainable development goals on the strategic management level according to the proposed matrix (Fig. 3). There is an objective need to design a model of efficiency assessment of management decisions on operational and strategic management levels, their correlation and influence on the goal function relevant in the following aspects of ICZM:

1) ecological balance;
2) economic indicators;
3) ethical aspects;
4) institutional aspects;
5) social aspects;
6) technological development.

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[1] Towards a European Integrated Coastal Zone Management (ICZM) Strategy: the General Principles and Policy Options, a reflection paper, 1999, *Directorates-General Environment, Nuclear Safety and Civil Protextion Fisheries Regional Policies and Cohesion*, URL: https://ec.europa.eu/environment/iczm/pdf/vol1.pdf (accessed 02.02.2023).

Thus, the research question of the present study aims to design performance indicators that align with the complex functioning of the seaport. These indicators should encompass various aspects of port activity and deviate from traditional approaches, such as comparing current values with those from the previous period, among others.

Analysis of the performance efficiency indicators of the Baltic seaports

Further, we consider diversified technical metrics relevant to the port performance analysis in order to verify the proposed methodology for tactical and strategic management levels [28; 29]. It includes the tasks of facility allocation, process intensity, number of technical vehicle service zones and so on [30—32]. The generalized results of the analysis of technical-related features are presented in Table 1.

Table 1

The basic technical characteristics of the Baltic seaports, 2022 year

Port	Throughput capacity, thousand tons per year	Navigation period	Port area, hectares	Water area, km^2	Berths number
Saint Petersburg	118 246.01	All year round	745.9	616.93	149
Vyborg	1970	All year round	16.658	2.87	9
Vysotsk	21 200	All year round	143.6	1.26	8
Kaliningrad	45 023.2	All year round	376.91	21.33	106
Primorsk	86.5	From May till November	247.448	31.77	12
Ust-Luga	156 000.25	All year round	1 188.1997	67.56	41

Source: complied according to the Rosmorport.[1]

The next step of the Baltic Seaports analysis includes an investigation of the investment activities. Consider the investment projects realized up to the current period and their results (Table 2).

Table 2

Investment projects implemented by the Baltic Seaports, 2022 year

Port	Investment project	Period	Results
Saint Petersburg	Icebreaking fleet facilities have been launched (two berths and navigation signs)	2018	The necessary safety facilities for the icebreaking fleet have been established, resulting in decreased costs for renting berths

[1] North-western basin branch, 2022, *Rosmorport*, URL: https://www.rosmorport.ru/filials/spb_seaports/ (accessed 28.12.2022).

The end of Table 2

Port	Investment project	Period	Results
Vyborg	Large-scale modernization associated with a reduction in coal shipments and a focus on liquid cargo	2024—2025	Port dependence on the coal supply has been decreased
Vysotsk	A grain terminal is planned to be launched with an estimated contract sum of 5.5 billion rubles	2022	Plans include the creation of 50 jobs, along with the construction of a warehouse complex with a capacity of 240,000 metric tons
Kaliningrad	The reconstructed base of navigation equipment was put into operation	2019	Nine buildings have been built. The berth has been reconstructed. Increased safety of ships navigation
Primorsk	Realization of the project 'Primorsky universal loading complex'	Up to 2024	The cargo turnover of the port increased up to 65 million tons per year. A logistics centre and new terminals were built
Ust-Luga	The new water area in the southern part of the port was started for use	2022	There are created conditions for the ships «Astrakhan», «SL-7», «SO-14»

Source: complied according to the Rosmorport.[1]

Despite the complicated economic and political situation in the country and worldwide, planned investment projects aimed at modernizing and enhancing the performance of Baltic seaports are not being squeezed or postponed. On the contrary, new investment projects are being developed.

The next step of the proposed conceptual approach is focused on environmental concerns. As mentioned earlier, the objectives of sustainable development garner significant attention from local authorities and international communities. This is reflected in the activities of the seaport through information integration and the utilization of advanced technologies [33]. For example, the 'Ecological justification of economic activities to maintain the design depths in the water areas, channels and fairways of the seaport Big Port Saint Petersburg in 2016—2026' is the document that was developed to regulate the annual performance of repair dredging. As part of the implementation of this project, a total of 53.9 million rubles were allocated to the port for fish farming based on the results from 2012 to 2021. This allocation allows for a comparison between the goals of sustainable development and the budget planning of the port.

[1] North-western basin branch, 2022, *Rosmorport*, URL: https://www.rosmorport.ru/filials/spb_seaports/ (accessed 28.12.2022).

Let us consider other examples of the ecological activities of the Baltic Seaports. In particular, the port authorities of Saint Petersburg have developed an ecological programme, receiving annual funding (in 2019 — 66 million rubles). The main ecological services provided by that port are the following: collecting, transporting and disposal of the ship wastes. The same eco-services are provided in the port of Ust-Luga with the use of a vessel collector, a waste processing station and specialized transport for waste transportation.

The ecological policy of the Kaliningrad port includes various environmental protection measures, such as enhancing personnel qualifications in this field and implementing measures to prevent air and water pollution. The Kaliningrad port administration has implemented the following actions: equipping tankers with floating roofs to reduce air emissions, waterproofing the surfaces of tankers to eliminate the possibility of soil pollution, and constructing treatment facilities to prevent water resource pollution.

Vyborg Port demonstrates a proactive approach in adhering to sustainable development principles. For example, in 2018, they developed an ecological strategy that spans until 2025. This strategy facilitated the implementation of dust-reducing equipment to mitigate coal dust in and around the port premises. Furthermore, the port authorities allocated funds to provide citizens with double-glazed windows to reduce noise levels in their homes.

In contrast, the port of Vysotsk has not implemented similar measures, resulting in citizens filing lawsuits highlighting negative impacts associated with the port's activities. The only environmental initiative undertaken by the port was the launch of a complex of treatment facilities in 2011.

Of particular interest are the characteristics of port activities during the last year. Analysis of statistical data and reports from 2022 reveals that these changes are a result of sanctions and limitations imposed on companies engaged in various activities within the seaport territories. Despite significant investments in infrastructure and the implementation of informational transformations in the Baltic Seaports (totaling 117.1 million), the development dynamic is currently negative. Specifically, the Saint Petersburg port's performance has been affected adversely. In 2022, the share of incoming ships decreased by 30 %, with only 294 sea vessels recorded compared to 418 in 2021. The decline in the number of foreign vessels arriving at the Baltic Seaports appears to be the primary factor contributing to this trend. However, it is worth noting that in March 2022, the number of vessels arriving at the port of Ust-Luga remained stable compared to the same period in 2021, while the port of Primorsk witnessed an increase in vessel arrivals. This observed imbalance emphasizes the need for seaports to have a sensitive logistics system in conditions of external instability, necessitating careful monitoring and evaluation of their activities.

Performance analysis requires the use of a system of indicators. The most relevant is the accounting of five groups of key indicators: indicators of operational activity, the level of technical (including innovative) development, environmen-

tal factors [34], socially significant indicators (for example, the level of migration [35]), and economic indicators [26]. At the same time, there is no single integrated approach to the number and composition of performance indicators today [21; 36]. In [21], it is emphasized that studies on the evaluation of port performance and the development of a system of performance analysis indicators can be divided into three groups in accordance with the focus of publications:

— the impact of emissions (including greenhouse gases) on the ecosystem of coastal zones, including those associated with intensive port activity;

— introduction of advanced sustainable development practices into the work of the port;

— efficient use of the economic and ecological potential of coastal zones in the context of achieving target values.

However, it is important to note that none of the mentioned directions can be considered the sole correct approach. Only a systemic approach can provide answers to the challenging questions of port logistics management. Therefore, the use of comprehensive performance indicators becomes particularly intriguing, as they enable the tracking of the interplay between environmental protection initiatives, social aspects, and the economic outcomes of seaport activities. In our view, the approach presented in the work of Italian experts [21] is highly valuable, as it facilitates the consideration of these parameters through two essential indicators of port efficiency:

— EQI — Environmental Quality Index, it is used to access the pollution level of the coastal zone related to the port activities; EQI can be defined with CO_2 volume. The lower EQI, the worse environmental conditions of the coastal zone of a certain port. In the article [21] the authors suggest defining EQI through the relation of cargo turnover to the emissions volume CO_2.

— The GPE (Green Port Efforts) index reflects the environmental obligations of port authorities and encompasses several blocks: the strategy of eco-management, eco-design, and ecological certification. The first block includes activities aimed at reducing emissions, optimizing energy usage, and the mandatory inclusion of eco-related aspects in concession contracts. The second block involves projects for environmental protection of the coastal zone, financed by the government and/or port authorities. The third block considers the application of ecological certification (ISO-14001) in port activities, the implementation of environment-protection projects in the coastal zone, and the monitoring of water and air quality. This block is particularly significant as eco-certification is a voluntary option that highlights the port's initiatives for environmental protection. In our research, we define GPE based on the relationship between investment volume and innovations in the port area. This allows us to focus on the effectiveness of investments in specific coastal zones. Additionally, we consider a decreasing coefficient if there is no regular monitoring of air and water pollution, or an increasing coefficient if ecological monitoring is conducted on a regular basis. A higher GPE value indicates higher port performance.

In the context of ICZM both indicators look relevant as their application allows taking the port performance with economic, ecological, social aspects, and consider the positions of stakeholders (including investors) on multidimensional seaports analysis (Fig. 3)

After considering the number and sequence of the indicators, the next step in the assessment analysis involves selecting an appropriate methodology. In the article [37], the Data Envelopment Analysis (DEA) is proposed as a decision support process for assessment. The authors conducted the DEA using MATLAB and DEA solver in MsExcel. However, despite its advantages, this approach has certain limitations when aiming for unambiguous efficiency assessment. For instance, in the context of the considered data volume, the number of research objects is significantly lower than the input and output parameters. Additionally, there may be a high level of errors in accordance with the input and output parameters, among other challenges. That is why we suggest using the methodology of benchmarking (or best practice) and method of the proportional effect distribution [38; 39] to create combined metrics.[1] To track the correlation between the innovative activity of a specific port, which focuses on environmental protection and operational excellence, and its economic results, the performance assessment can be conducted using two comprehensive indicators, EQI and GPE. Table 3 provides the descriptive statistics and performance indicators of the Baltic Seaports.

Table 3

Descriptive statistics and performance indicators of the Baltic Seaports of Russia

Parameter, data on 2022 year	Saint Petersburg port	Vyborg port	Vysotsk port	Kaliningrad port	Primorsk port	Ust-Luga port
Descriptive statistics for 2022 year*						
Monitoring of the air and water quality on the coastal zone**	1.1	1.1	0.1	1.1	1.1	1.1
Port area, hectares	745.9	16.658	143.6	376.91	247.448	1 188.2
Number of employees, people	1100	477	509	1055	892	520
Volume of investments to innovations, million rubles	1500	2400	5500	2000	1090	30 000
EQI: CO_2 emissions, million tones	0.101	0.002	0.042	0.023	0.148	0.323
Cargo turnover, million tones	38.8	0.6	16	8.9	57.1	124.1
Estimated performance indicators						
EQI	384.16	300	380.95	389.96	385.81	384.21

[1] Fact-finding studies in support of the development of an EU strategy for freight transport logistics Lot 1: Analysis of the EU logistics sector, 2015, *Publication office of the European Union,* URL: https://op.europa.eu/en/publication-detail/-/publication/4c60a2c5-969e-11e7-b92d-01aa75ed71a1 (accessed 05.12.2022).

The end of Table 3

Parameter, data on 2022 year	Saint Petersburg port	Vyborg port	Vysotsk port	Kaliningrad port	Primorsk port	Ust-Luga port
EQI, %	17.26	13.48	17.12	17.53	17.34	17.27
Deviation from the leading port, %	− 0.26	− 4.04	− 0.40	0	− 0.19	− 0.26
GPE	1.57	5.53	1.08	2.08	1.34	63.46
GPE, %	2.091	7.37	1.43	2.77	1.79	84.53
Deviation from the leading port, %	− 82.43	− 77.16	− 83.09	− 81.75	− 82.74	0

Source: complied from the data.[1]

** Value 1,1 corresponds to monitoring procedures conducted, 0,1 corresponds to none of monitoring procedures conducted.

[1] North-western basin branch, 2023, *Rosmorport,* URL: https://www.rosmorport.ru/filials/spb_seaports/ (accessed 30.12.2022) ; Sustainable development, 2023, *Seaport Saint Petersburg,* URL: https://seaport.spb.ru/sustainable-development/ (accessed 04.01.2023) ; About us, 2022, *Seaport Saint Petersburg,* URL: https://seaport.spb.ru/about/ (accessed 29.12.2022) ; Disclosure of information on the possibilities of water supply and sanitation, 2023, *Seaport Saint Petersburg,* URL: https://seaport.spb.ru/documents/information-disclosure/organization-of-water-supply-and-sewerage/ (accessed 11.01.2023) ; Environment, 2023, *Seaport Saint Petersburg,* URL: https://seaport.spb.ru/sustainable-development/environment/ (accessed 01.02.2023) ; The cargo turnover of Russian ports has increased on 0,7 % (detalization), 2023, *Portnews*, URL: https://portnews.ru/news/341725/ (accessed 11.02.2023) ; Ecology, 2023, *Port logistic,* URL: http://www.portlog.ru/jekologija/ (accessed 11.02.2023) ; «Northseaproject» will finish the reconstruction of three berths and Gutuev island the Seaport of Saint Petersburg, 2023, *Portnews*, URL: https://portnews.ru/news/341600/ (accessed 19.01.2023) ; A dry-cargo port will be built in the Vyborgsky District for more than 24 billion rubles, 2019, *Rianews*, URL: https://ria.ru/20190606/1555336031.html (accessed 19.01.2023) ; Terminals competition: on the Baltic it is announced another new project, 2022, *RBC*, URL: https://www.rbc.ru/spb_sz/01/09/2022/63105abb9a794721b4460a75: (accessed 10.01.2023) ; News of the North-Western Basin Branch, 2022, *Rosmorport*, URL: https://www.rosmorport.ru/filials/spb_news_main/44713/ (accessed 11.12.2022) ; Investors will invest 1 billion in the project of a new port in Primorsk, 2019, *Moika 78,* URL: https://moika78.ru/news/2019-05-23/234061-investory-vlozhat-1-mlrd-v-proekt-novogo-porta-v-primorske/ (accessed 12.12.2022) ; The Leningrad region has approved a marine project worth 30 billion rubles and 600 workplaces, 2022, *RBC*, URL: https://www.rbc.ru/spb_sz/17/06/2022/62ac1da59a794789f2a507d1 (accessed 24.12.2022) ; The main indicators of environmental protection, 2021, *Rosstat*, URL: https://rosstat.gov.ru/storage/mediabank/oxr_bul_2021.pdf (accessed 24.12.2022) ; Russian Seaport turnover during the first 12 months of the 2022 year, 2023, *Association of the sea trading ports*, URL: https://www.morport.com/rus/news/gruzooborot-morskih-portov-rossii-za-12-mesyacev-2022-g (accessed 20.01.2023).

The analysis of the results obtained indicates that the seaport of Kaliningrad demonstrates the highest effectiveness in terms of reducing the anthropogenic impact on the environment, with an EQI value of 17.53 %. Herewith, the deviation of the majority of other ports do not exceed 0,4 %, except Vyborg (4 %). According to the GPE indicator, which reflects the effectiveness of the use of investments in innovations in the territory of the seaport, the Ust-Luga port obtained the higher GPE value (GPE = 84 %). The proposed approach for calculating two performance indicators of the port takes into account multiple aspects of its activity, including economic, investment, social, environmental, and technological factors. This approach offers a new perspective on the traditional problem of analysis and efficiency evaluation in ports.

Table 4 presents a matrix that outlines the statistical indicators of port activity, which are considered in determining the comprehensive indicators of Environmental Quality Index (EQI) and Green Port Efforts (GPE). The table provides a schematic representation of the various factors and indicators that contribute to the overall assessment of the port's performance in terms of environmental sustainability and operational efficiency.

Table 4

**Matrix of Parameter Correlations: Four Performance Aspects
in Relation to Management Levels**

Decision-making level	Strategic	Tactical	Operational
Aspects of port performance			
Economic	Port area		Cargo turnover
Investing	Investments		
Technological		Investments	
Ecological		Eco-projects	Emissions

Note: the green color reflects the parameters used in EQI estimation, the orange color reflects the parameters used in GPE estimation.

The proposed approach enables the evaluation of port activities using multiple criteria through the utilization of two comprehensive performance indicators — EQI and GPE — across various management levels. The resulting quantitative index provides a relative assessment of efficiency and can be utilized for monitoring the port's performance over time.

Based on the analysis of the results obtained, the authors developed a system of recommendations to improve the efficiency of the ports of the Baltic Basin of Russia by improving the values of the parameters included in the calculation of EQI and GPE indicators:

1. It is necessary to increase the volume of investments in the ports of Primorsk and Kaliningrad, as the number of inward vessel flows to these ports is growing despite the sanctions.

2. As part of the activities of each analyzed port, it is important to focus on the development of technological capabilities, including the automation and digitalization of cargo handling processes, to reduce CO_2 emissions.

3. It is require to introduce modern environmentally friendly technologies into the activities of ports.

4. A strategic plan needs to be developed, which includes identifying target markets and products, as well as assessing opportunities to increase the volume of processed cargo flows. This measure is particularly relevant for ports experiencing a downward trend in cargo turnover, such as Vyborg, Vysotsk, and Saint Petersburg.

5. Business processes in the analyzed ports should be optimized to reduce time losses, which will improve efficiency in terms of economic indicators.

Improving and modernizing the infrastructure of Vyborg and Vysotsk ports can significantly increase their cargo turnover. Measures for achieving this include the construction of new berths and the enhancement of loading and unloading equipment.

6. In ports such as Ust-Luga, Saint Petersburg, and Primorsk, tax incentives could be introduced for ships that use environmentally friendly fuels. This initiative aims to stimulate the use of environmentally friendly vessels, which will help reduce the carbon footprint.

7. The installation of energy-saving technologies can be implemented as a measure to reduce emissions from port activities.

Discussion and conclusions

In this article, we consider a seaport as a critical element of the country's transport and logistics system. We propose an investigation of its activities using a developed algorithm for analyzing port performance, along with the application of a conceptual scheme that includes a list of tasks implemented within the operational, tactical, and strategic levels of management. The proposed methodological approach enables the analysis and evaluation of a port's efficiency, considering both traditionally used indicators of a technical nature and economic efficiency indicators, as well as investment planning and sustainable development goals. To accomplish this, we suggest, at the first stage, identifying stakeholders and then grouping them by management levels. Based on the tasks of each level, specific parameters are utilized in the estimation of performance indicators.

The study utilized data on cargo turnover, investment in innovation, carbon emissions, port area, and the number of environmental project initiatives aimed at achieving sustainable development goals and objectives as the basis for calculating two comprehensive performance indicators (EQI and GPE). To validate the proposed approach, the article presents the results of cargo turnover in Russian ports, determines the market share of ports in the Baltic basin, examines investment projects, port throughput, innovations in reducing the anthropogenic impact

of port infrastructure on the environment, and more. Consequently, performance indicator values were obtained for each port in the Baltic basin for the year 2022, and a system of recommendations has been developed. As a result, all research tasks have been fully completed, and the study goal has been achieved.

We also highlight that the proposed approach is applicable to the analysis and evaluation of port activities in other regions of Russia, as it serves as a universal tool for strategic management. The comprehensive examination of various aspects of seaport functioning through a three-level management system underscores the practical significance of this work for top and middle-management personnel. Consequently, the integrated approach presented in the article encompasses a multidimensional analysis of port efficiency, incorporating both traditional economically significant indicators and new facets of activity. Considering these aspects becomes particularly relevant in the face of global changes and challenges.

Considering the current international situation, it can be concluded that political and economic factors exert a significant influence on the port business. This situation presents both challenges and opportunities for seaport management. On one hand, it presents a challenging situation; on the other hand, it encourages the exploration of new solutions to adapt to prevailing market conditions. Therefore, the scientific discourse on analyzing seaport activities can be further expanded to explore the incorporation of risk management methods. This includes examining various strategies for managing shocks and post-shock conditions in seaport operations as integral components of the logistics system during crisis situations.

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INTERNATIONAL RELATIONS

EXPANSIONISM IN POLAND'S STRATEGIC CULTURE: HISTORICAL RETROSPECTIVE AND VARIATIONS

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This article deals with the problem of assessing and interpreting expansionist elements in Poland's international political behaviour. The problem is approached using the concept of the strategic culture of states, which covers beliefs, perceptions, and the language states use to describe their own and other countries' actions. The study examines what expansionist types of strategic culture have developed in Poland, how relevant they are in the current political landscape, and describes their differences and similarities. To this end, the intellectual origins of foreign policy ideas prevalent in Poland (Rzeczpospolita) are traced, and the challenges of the external environment are correlated with the way they have been perceived in the course of Poland's historical development. Two historically contingent expansionist types of strategic culture were identified. Firstly, as a medium-sized state that has faced military defeats, the Polish state has hardly embraced ideas bearing on the 'besieged fortress' concept. Secondly, the very culture of limited power politics has assumed some unique characteristics in the country: greater readiness to take risks and fascination with power actions. This state of affairs is largely a result of the contours of the regional project having been drawn for the neighbouring states mostly based on the negative type of consolidation (against the Muslims and later the Bolsheviks) and therefore never reaching a sufficient level of detail.

Keywords:
Poland, Rzeczpospolita, strategic culture, culture of a "besieged fortress", culture of limited power politics

Introduction

Russian academic literature has paid much attention to Poland's ambition to play a special role in Europe, set an example to its neighbours and preserve and enhance its asset of Latin Christian values [1; 2]. A popular view holds that official Warsaw strives to become not only the leader in Central and Eastern Europe but also a mediator between the West and post-Soviet states. Most of these com-

mentaries emphasise Poland's attempts to exacerbate the disagreement between Russia and other former Soviet republics, extend its influence over the latter and foist its view of the world on the region [3; 4]. Poland has obviously espoused some degree of strategic expansionism, and the question, as often is the case, is in the detail.

It is generally advisable to employ the concept of strategic culture in one's analysis when measuring the degree of expansionism. From the 1970s, strategic culture was understood as a certain degree of subjectivity in reacting to external factors. In most cases, this concerned military-political issues: the problems, risks and threats a state sees as imminent; the existing security beliefs and discussions; the terms and categories deemed adequate to describe the external environment [5, p. 7—9]. Strategic culture in a narrow sense was believed to have three components — political goals and justification of power actions, basic rules of conduct towards the opponent (annihilation, attrition, safeguarding of achievements) and operational preferences (the way resources are used to attain goals) [6, p. 7—12] — all three being a product of military experience, the advances in political thought concerning war and peace, and the religious and ethical attitudes prevalent in society [7].

Today's science offers a broader interpretation of strategic culture, one that is dynamic and generally non-essentialist [8, p. 4—11]. This new approach emphasises the inhomogeneous and fluid nature of international actors' identities. Although, in analytical terms, it transpires that one blurred concept becomes instrumental in revealing the content of some other, often just as blurred, phenomena, the focus of research shifts, and strategic culture itself turns into an independent variable [9; 10]. Nevertheless, when examining strategic culture, one can identify several complexes serving as a means to construct and assess the environment and a state's place within it. Thus, investigating the influence of strategic culture is closely connected with the transition between 'ideal types', their displacement and complementation accompanied by the internal transformation of each type of strategic culture (subculture) [11; 12].

Building on the works of Alastair Johnston and my earlier research, I propose a classification of the ideal types of strategic cultures. I consider strategic preferences as the decisive criterion, which includes both permanent preferences (such as the choice between coercion or cooperation) and preferences that may change in response to the volatile environment. These preferences reflect the desire to either maintain or alter the status quo. Another major factor is the ability to act upon these preferences, i. e. whether the goals are attained in full, in part or to a limited extent [14; 15, p. 55—57, 112—117]. Different configurations of these factors yield nine ideal types of strategic factors differing in the extent of formalisation, the degree of variety and military/diplomatic orientation (Table 1). An actor (in most cases, a state) will not necessarily exhibit all the following types [15, p. 147—152].

Ideal types of strategic cultures (based on Johnston's commentary)

Strategic Preferences		Significance of external limitations (~inability to destroy the enemy)		
		High (all actions have been formalised)	Medium (transition to less formal actions)	Low (transition to unilateral ostentatious actions)
Preference for cooperation	Status quo maintained (accommodation)	Unlimited internationalisation (idealpolitik)	Limited internationalisation	Normative unification (international community)
	Status quo altered (defence)	Neutrality	Isolationism	Political fortification: 'fortification gigantism'/ outpost
Preference for coercion	Status quo altered = status quo maintained (expansion)	Besieged fortress culture	Limited power politics (realpolitik)	Unlimited power policy (hardpolitik)

To further analyze the situation in Poland, let us specify the ideal types of expansionist strategic culture:

— besieged fortress culture is rooted in the actor's negative judgment of the external environment, the ambition to restrict unwanted processes and phenomena by increasing the cost of aggression and minor preventive operations (sorties, diversions, espionage) for any opponent, as well as in the aspiration to disorganise international relations as much as possible;

— limited power politics culture presupposes the actor's negative judgement of the external environment, the aspiration to restrict negative processes and phenomena by identifying the main threat and the most dangerous actor, the ability to benefit from flexible occasional alliances and the awareness of one's resources for pursuing a global or regional political project;

— unlimited power politics resolves itself into the actor's negative judgement of the external environment, the aspiration to transform the latter as much as possible so that it suits the actor's interests and the exploitation of one's resources in pursuing a global or regional political project.

An exploration of all the possible types of Poland's strategic culture would require a much lengthier contribution. Thus, this article limits itself to describing the historical and ideational context of the expansionist types of Poland's strategic culture and does not cover the period between the two world wars when defensive strategies seemed to prevail in the country. Poland's size precludes it

from embracing the ideal types of strategic culture, which stem from the actual capacity to destroy a potential enemy and, in doing so, lift any external limitations on politics. The two other types, firstly, may not be seen as equally desirable; secondly, they may reflect a different image of the external environment as perceived by Poland and communicate different representations of the 'ideal self' in international relations.

The outlines of Polish expansionism

Although the borders of Poland[1] have changed over time, initially, the state was a middle-sized country.[2] Almost at any moment of its history, it has bordered on a larger power: the Holy Roman Empire and Prussia/Germany in the West, the Ottoman Empire in the south; Kievan Rus and later the Muscovite/Russian state in the east. As soon as it emerged on the political map of the world, Poland vied for territory with the Czech Duchy in Silesia, the German Empire in Pomerania and the Kievan state in Galicia. Many of Poland's neighbouring states would at some point become its military adversaries, be it the smaller countries (Hungary, the Crimean Khanate, the Principality of Moldavia, Denmark) or great regional powers (the Ottoman Empire, the Russian state, Sweden, the Teutonic Order/Prussia).

These conflicts did not always end in victory. Throughout its history, Poland has twice lost its statehood (in the 12th-13th centuries[3] and 1795—1918), thrice been occupied (during the Swedish Deluge of 1555—1560, the Treaty of Altranstädt of 1706—1709 and the German General Government of 1939—1944) and four times descended into full-scale civil war, all of them under external influence (1038—1039, 1382—1385, 1704—1706, 1764) [16, p. 7—12, 20—32, 64—81, 85—90]. As a result, Polish politicians could not commit to the maximum transformation of the external environment. Moreover, the geographical position of Rzeczpospolita made it difficult for the country to lay claims to effective leadership in the Baltic, Black Sea or Eastern European region. From the early stages of its history, Poland could avail itself only of those expansionist ideas that were linked to the strategic cultures of a 'besieged fortress' or limited power politics.

In such conditions, some states would opt for a subordinate position or strive to forge a military-political alliance with more powerful players, i.e. employ a bandwagoning strategy, as today's neorealists put it. Yet, Poland had strong expansionist incentives: over the 11 centuries of its history, the Polish state has used power politics as a tool to alter the mid-term state of affairs. This conclusion is

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[1] Here and below 'Poland' and 'Rzeczpospolita' will be used interchangeably despite the obvious differences.

[2] Rzeczpospolita covered the largest area in 1634—1667: 990,000 km^2, compared to 312,000 km^2 today.

[3] Naturally, during feudal fragmentation, decentralisation was inevitable.

supported by the following data: in 960—1795, Poland took part in 247 international conflicts, i. e. it was at war with other states during one out of three years. Throughout a significant part of the 19th—21st centuries, the country was either not a sovereign state or part of military-political alliances (177 out of 222 years), which placed serious limitations on power politics. Yet, in this condition, Poland went through two world wars and the cold war. In the interwar period (1918—1939), it participated in at least seven armed conflicts within its borders, thus maintaining the earlier observed warfare frequency, i. e. fighting during one out of three years. Overall, the quantity of conflicts did not turn into quality since, at the critical historical moment, which fell on the 16th—17th centuries, Poland failed to build a centrally controlled military force and pool sufficient resources to modernise it [17, p. 144—147].

A precarious international situation and the difficulty of giving an adequate response to impending challenges pushed Poland towards constant manoeuvring and search for ways to boost its standing in the region. It would form political unions with the Czech state, Hungary and Saxony, and lay claims to the Principality of Moldavia and the Russian state. This inconsistent behaviour was informed, nevertheless, by a clear understanding of national goals. The instruments used to attain them, however, lacked structure, and the effect of this incongruence reverberates to this day. Bolesław Balcerowicz, a divisional general and professor at the University of Warsaw, has emphasised that security politics and political culture retain, despite the changes of the recent decades, the traces of pernicious and historically widespread non-strategicity [18, p. 406].

Poland's strategic culture did not originally have a clear hierarchy of potential adversaries. For example, the first Polish chronicler Gallus Anonymus wrote in the early 12th century: 'in spite of being surrounded by all the many aforementioned peoples, Christian and pagan alike, and frequently attacked by all and sundry, it has never been completely subjugated by anyone' [19, p. 15]. Probably, at the time, all the neighbours were considered to pose an equal threat, which is obliquely evidenced by the descriptions of neighbouring peoples and countries found in Polish chronicles. For instance, Gallus Anonymus vividly depicts the Prussians as living 'without king and without law, and hav[ing] not abandoned their ancient faithlessness and ferocity', writes that 'the faith of the Czechs goes up and down like a wheel'; names 'simplicity' the characteristic trait of the Russians and proneness to 'perjury' that of the Germans [19, p. 41, 195, 235, 253].[1]

Before the partitions, Poland's political practice did not resolve itself into the search for enemies amongst neighbours: conflicts and claims would often be replaced by political rapprochement. The change became fairly evident after

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[1] The translation has been verified in accordance with the following source: Bak, J. M., Borkowska, U., Constable, G., Jaritz, G., Klaniczay, G. (eds.). Gesta Principum Polonorum: The Deeds of the Princes of the Poles. Central European University Press, 2003.

the introduction of the royal election institution. On more than one occasion, Russian tsars and their children had a strong chance to accede to the throne of Rzeczpospolita: in 1573, 1576, 1587, 1656 (*vivente rege*), 1668 and 1673 [20; 21]. There were many cases as well in which the Habsburgs, the almost uninterrupted rulers of the Holy Roman Empire in the 15th—18th centuries, had similarly high chances of being enthroned in Poland. And once a Habsburg did wear the crown of Poland, albeit for a very short period between 1306 and 1307. The other kings of Poland came from the royal families of the Czech state, Tyrol (Duchy of Carinthia), Sweden, Transylvania, France and Saxony. Only three neighbours of Poland — the Ottoman Empire, the Duchy/Kingdom of Prussia (a vassal of the Polish crown in 1525—1657) and Denmark — had never put forward a royal candidate.

A prime example of flexibility was the foreign policy pursued by King John III Sobieski, dubbed *the last knight* of Christendom (1674—1696). His election was supported by the pro-French party in the Sejm, which incited its candidates to oppose the Habsburgs and their occasional allies, such as Russia. In his first years on the throne, John Sobieski formulated his 'Baltic goals', whilst actively preparing for war with Brandenburg/Prussia and striving to keep peace with Russia, the Habsburgs and Turkey. Soon after that, in 1678—1679, Poland proposed a union of Christian nations against the Ottoman Empire. Later, it became one of the founders of the Holy League, which was in effect a coalition with the Habsburgs. Over several years, Poland changed both its foreign and military policy priorities, shifting them from the South to the North, and its pool of allies (the Habsburgs, the large duchies of the Holy Russian Empire and Russia substituted for France, Sweden and Turkey's Danube vassals) [22; 23]. John Sobieski, however, looked askance at his new allies: he used to liken the Germans to horses as, he insisted, neither knew their real power [24, s. 39].

From the ideological perspective, Poland positioned itself as the region's most Catholic country and, when devising its project, relied on the logic of converting neighbours to a 'truer' religion. Yet, in the 16th—17th centuries, this doctrine lost its popularity amid the turbulence of the Reformation and Counter-Reformation. To a degree, this development was very much in line with the general European trend towards secularisation. According to Kalevi Holsti's calculations, in 1648—1713, states tended to abstain from religious justifications for their territorial claims, using them in only 14 % of cases as pretexts for war: instead, they either made unvarnished territorial demands (55 %) or cited commercial grievances (36 %) [25, p. 49]. The religious logic of strife provoked a series of conflicts between Poland on the one hand and Protestant Sweden, Orthodox Russia and Muslim Turkey on the other. As a result, Poland had to cede the territories that today are part of Ukraine and the Baltic States. Following the same religious logic, Warsaw often sought alliances with the actors that, by definition, could not be

committed to the cause, such as the Republic of Venice or Spain. Finally, as the historian Jerzy Topolski puts it, religious wars gradually turned into self-destructive conflicts [26, p. 412—424].

One of the first thinkers to assert that religion had exhausted its military-political power was the Polish Humanist Andrzej Frycz Modrzewski (1503—1572). In his *Commentaries on the Improvement of Commonwealth*, he called upon Polish kings to change their strategic culture (if we put it in contemporary terms), abandoning the practices of religious wars and flexible unions. Frycz Modrzewski formulated an idea that sounded rather radical in Poland of the time: treaties could indeed be concluded with peoples following a different religion [27, p. 96]. He chided wars waged to expand territories, bring glory to the ruler or undermine the long-established rules of international conduct. What Frycz Modrzewski proposed back in his time is reminiscent of the besieged fortress culture: monitoring the diplomatic activity of potential adversaries, taking advantage of barriers to trade in military goods and making use of the natural terrain to build fortifications. Within this logic, Poland had to be ready to repel an attack whilst remaining morally pure and giving no reason for hostile actions [28, p. 330—334; 29].

Such an abrupt abandonment of religion and opportunities to acquire the spoils of war was impossible since the most privileged stratum, the *szlachta*, strived to expand its economic influence over new territories and their residents [26, s. 491—492, 511—512]. Most of the politicians and thinkers of the Polish Renaissance and Enlightenment embraced the inevitability of expansion, such as efforts to reclaim the lost lands. The intellectuals, in their turn, entertained the idea of a new mechanism for legitimising expansion rather than that of a new type of political culture. This choice, however, was never real. As Andrzej Novak writes, Rzeczpospolita kept oscillating between justifying its actions by the superiority of domestic governance (republicanism) and by the need to follow best practices of the time (modernising patriotism) [30, p. 13—21]. Whilst the former was widely accepted across Europe, appealing, due to its ancient origin, to the educated class,[1] the latter was a product of the obvious weakness of Poland's domestic governance and the necessity to draw pragmatically on international experience [31]. Apparently, both mechanisms for foreign policy legitimisation functioned in parallel, now cyclically alternating, now united through synthesis (particularly, in the 19th century during the age of Polish Romanticism).

Paradoxical as it may sound, powerful impetus was given to the culture of expansionism by the three partitions of Poland. The emergence of nationalism, understood in its contemporary sense, confronted many European states with the

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[1] The legitimisation of foreign policy behaviour through the uniqueness and superiority of domestic governance probably originates from 'Pericles' Funeral Oration' as recounted in Thucydidis's *History of the Peloponnesian War*.

dilemma between territorial integrity and self-determination. In the middle of the fluctuating struggle for the restoration of statehood, Polish intellectuals came up with two curious innovations in military and foreign policy strategy. Firstly, as Emanuel Rostworowski formulated it, there appeared a cult of hopeless uprisings. This ideational construct suggested that military actions were to be taken in the Polish territory not at the most opportune moment, i. e., when the beneficiaries of the partitions were in a fragile state or a powerful international coalition had formed against them but whenever possible [32, s. 193—194]. It was critical not to wait for a favourable opportunity but to press on with raising the Polish question and bringing it back onto the international agenda. Secondly, the theory of two enemies gradually emerged in the works of thinkers and political writers. This theory marked Prussia/Germany and Russia/the USSR as Poland's principal adversaries.[1] Since it was impossible to defeat these enemies, the struggle against them and for the restoration of the country's pre-partition territory was to be carried out with external assistance [33, p. 22—25]. Thus, it was deemed possible to forge long-standing alliances with third countries, such as France and, to a lesser degree, the UK in order to deter the main military threats.

A brief analysis of Rzeczpospolita's foreign policy behaviour and political thought of the 10th—19th centuries has identified several important features of expansionism as it manifests itself in Polish strategic culture. Firstly, despite its medium size and repeated military defeats, the Polish state did not embrace a complex of ideas that can be categorised under besieged fortress culture. Secondly, for a long time, Poland estimated the key military threats quite unsystematically, largely relying on diplomatic manoeuvres and flexible alliances. The theory of two enemies promoted to his day by the Polish right emerged only in the 19th century, during the period of statelessness. Thirdly, the legitimation of Rzeczpospolita's external expansion grew more diverse and less congruous: on the one hand, the domestic governance mechanism was seen as a cause of the state's decline; on the other, it was declared imperative to extend this political and administrative experience to other territories. Fourthly, 'self-destructive' conflicts and the 'cult of hopeless uprisings' made Polish strategic culture strongly predisposed to risk-taking and ostentatious power displays. Finally, at the core of the regional project that the country proposed to its neighbouring was the negative type of consolidation (at first, against the Muslims and, then, the Bolsheviks), rendering it impossible to achieve a substantial level of detail.

Conclusions for modern Poland

The literature tends to offer a two-tier classification of Poland's foreign political behaviour, based on the geographically and socioculturally contingent division into the Piast and Jagiellonian traditions. My foreign policy analysis goes

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[1] Remarkably, the third participant in the partitions, Austria-Hungary disappeared from the least as early as in the 19th century.

beyond the framework of geographical priorities (Western in the case of the Piast dynasty and Eastern in the case of the Jagiellons) and focuses on the thematic and functional aspects of the corresponding practices.

As previously stated, the identified types of strategic culture (strategic sub-cultures) are ideal variations, which hardly existed in reality. Rather, they inter-wove, competed and semantically enriched each other as vigorous debates raged on. Yet, even in this configuration, some of them spread more easily than others (Table 2). The medieval ethos of valour and honour gave a powerful impetus for Rzeczpospolita's limited power politics, and the partitions of Poland provided a clear understanding of which neighbouring actors posed the greatest threat. In the end, besieged fortress culture, which placed emphasis on ethical norms, had a tenuous influence on Poland's foreign policy behaviour.

Table 2

A comparison of the two types of Poland's expansionist strategic culture

Type	Besieged fortress culture	Limited power politics (realpolitik)
Purported founder	Andrzej Frycz Modrzewski	Gallus Anonymus
Popularity	Low	High
Risks and threats as seen by the state	Incautiousness of leaders; moral aspects of conflicts	'Two enemies'; the risk of one-on-one confrontation with a stronger opponent
Beliefs and debates on various security aspects	Development vs security	Regional leadership vs vassalage
Assessment of environment	Dangerous	Very dangerous
Poland as seen by other countries	Reasonable power	Epitome of valour
What Poland has to inspire in its neighbours	Anything but fear	Respect for the country's power
What Poland's behaviour towards other countries is based on	Borrowing best practices in governance and technology	Securing its rightful place in the region
Attitude to military and political alliances	Positive if they do not encumber the country	Positive if they facilitate the attainment of short- and medium-term goals

In the 20th century, there was an anomalous period in Poland's history (1919—1939) when the ideas of risks and threats, as well as the characteristics of the external environment, became grossly distorted. Poland's foreign policy was par-ticularly aggressive at the time, evidenced by not only the annexation of Lithua-

nian territories in 1920—1923 but also numerous attempts to acquire colonies on other continents, particularly through the efforts of the Maritime and Colonial League. For the most part, these political practices did not go beyond the boundaries of the main principles of limited power politics subculture.

Of course, emphasis on the uniqueness of the country's historical experience and its 'self' is part of Polish strategic culture. Yet, the inclination to see relations with other actors as useful and necessary is also visible in the identified types of strategic culture. First of all, this concerns best practices, which can be borrowed from neighbour states, and regional leadership structures potentially beneficial for all the participants. To a degree, such cooperation is interpreted as a struggle for a higher standing in the world, which is very much in agreement with Iver Nuemann's observation that Central European states' attempts at collaboration are always closely linked to protests and criticism against those who exclude these countries from important calculations [34, p. 208—212].

Since Poland is a member of NATO and the EU, it is worth noting that Polish strategic culture is based on a negative judgment of the external environment and a utilitarian attitude towards unions and coalitions. Warsaw has often viewed its membership in associations aimed at integration or military and political cooperation as a means to relieve anxiety about the external environment and reach the country's short- and medium-term goals. When accessing the EU and NATO, Poland's major political forces tried to reduce the cost of entry and alleviate some of the pressures of political and economic integration [35, p. 35—39]. Consequently, Polish strategic culture and some of its types remain committed to strongly positioning the state within the Euro-Atlantic project instead of letting it fade into the background of common spaces. This trend, visible in Polish conceptual documents since 2017, will be reinforced in the context of the current Ukraine events [36].

Overall, our preliminary work aimed at describing the semantic content of the expansionist types of Poland's strategic culture does not rule out other interpretations. Yet, it provides a comprehensive picture of the historical aspects of Polish discussion on foreign policy and security, its sources of inspiration and denial, as well as possible combinations of preferences and assessments of the external environment.

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INTERNATIONAL HERITAGE IN THE MEMORIAL LANDSCAPE OF THE KALININGRAD REGION

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This article aims to analyse the structure of sites in the Kaliningrad region commemorating events, phenomena or figures of international history, as well as to reveal their symbolic significance. The study uses empirical data on the origin, time of construction and purpose of the monuments, memorials and other places of commemoration. Theoretically, it draws on the concepts of cultural memory and sites of memory. The idiographic and historiographic methods were employed along with general scientific methods. At the core of the region's international memorial landscape structure are sites commemorating the German past of the area or linked to Lithuanian and, less frequently, Polish national cultures. The structure of the memorial heritage is largely a product of the selective preservation of pre-war monuments and constructions in the Soviet period and post-Soviet commemorative activities in the Kaliningrad region, 'a region of cooperation'. Its most substantial, German, component is a complex symbolic system honouring the intellectual culture of East Prussia and its prominent figures. And, not unlike its Lithuanian and Polish components, it lacks inner unity. Most of the memorial objects examined have been integrated into all-Russian or regional historical narratives and corresponding discourses. Reflecting the 'Russian story line' in the local history, it has been appropriated by the local culture of memory.

Keywords:
cultural memory, place of memory, Kaliningrad region, memorial landscape, narrative

Introduction

The current political situation in Eastern Europe and former Soviet states is dominated by growing instability and conflict as much as by intensifying confrontation in the information space, part of which is the 'struggle for the past' seeking to preserve the established accounts or making major changes in the 'memory space'. Just like popular science, educational and media narratives, an essential element of this struggle is the transformation of the symbolic space: the removal of 'alien' memorials failing to fit the symbolic landscape. The most effective way to wage a 'war of monuments' is their demolition, a quick action

generating instant publicity. As a rule, monument removal is accompanied by information campaigns justifying the demolition of cultural and historical heritage objects.

As the international crisis worsens, monument demolition gathers pace in Poland, the Baltics and particularly Ukraine, where numerous 'operations' aimed to destroy memorial sites connected to the history of the Russian Empire, the USSR or the life and achievements of prominent figures in Russian and Soviet culture have been carried out or are being prepared. These circumstances naturally draw scholarly attention to the structure of the memorial landscape of the Kaliningrad region, whose neighbours — Poland and Lithuania — are at the helm of cultural memory reformatting.

Apart from monuments and other memorial objects linked to the Russian/Soviet past, Russia's westernmost region is home to sundry sites commemorating events, phenomena and figures from international history. The answer to this puzzle is in the history of the region, which was established in 1946 on the territory of what was the northern part of Germany's province of East Prussia. The area had long been a 'crossroads of cultures' where ethnic groups and states had been coming in contact and dramatic events had been taking place, some of them closely intertwined with Russian history: the Grand Embassy of Peter the Great, the battles of the Seven Years', Napoleonic, First World and other wars. The area abounds with sites commemorating the final events of the Second World War in Europe, particularly the Red Army offensive of autumn 1944 — spring 1945. The past of East Prussia is inextricably linked to German, Polish and Lithuanian history. Despite the destruction wrought by the war and the complex fate of the local monuments, most of them survived the Soviet rule. Besides German, Polish and Lithuanian memorials, there are singular objects honouring the historical tradition of other European peoples and states, for example, France.

The region's international memorial heritage does not constitute a unified composite but has a complex structure. The symbolic significance of some commemorative sites permits embedding them into the Russian historical narrative, while others are linked exclusively to the history of Europe. Finally, there are those commemorative sites that have been integrated into the regional culture of remembrance.

This article seeks to analyse the structure of places of remembrance — monuments, memorials, commemorative plaques and commemorative architecture — that appeared in what is now Kaliningrad region primarily in the pre-war and post-Soviet periods and have a symbolic meaning associated with the history and national cultures of Germany, Poland and Lithuania. Describing this symbolic meaning is another aim of this study.

Historiographic and theoretical state of research

Monuments of the pre-war past preserved in the Kaliningrad region, as well as new places of remembrance have been extensively discussed in post-Soviet publications, many of them concrete historical studies and reference materials.

Pre-war, i.e. German, monuments are seen as part of the historical and cultural heritage and thus recognised as a factor in regional identity [1, p. 50—55; 2, p. 39, 40; 3, p. 53—56]. The origins of the peculiar regional narrative about the past, which emerged in the Soviet period have been addressed by Yuri Kostyash-ov, along with the general features of the historical consciousness of the region's Soviet population. It is worth noting that Kostyashov headed a project aiming to record the memories of the first settlers in the Kaliningrad region, many of whom spoke of the enormous influence landmark pre-war buildings and other artefacts had on the way Soviet people saw the region [4; 5]. The problem of the reception of German monumental heritage and the emergence of new places of remembrance associated with the region's pre-war history has been investigated by Syuzanna Fostova, Yuri Kostyashov and Ilya Dementyev [6—10]. A range of works published at the beginning of the 21st century describe the regional memorial landscape structure as complex and embracing pan-European, East Prussian and Russian commemorative sites, as well as those that are exclusive to Kalinin-grad [11, p. 28—31].

International scholars, particularly researchers from Germany and Poland, have also examined the historical consciousness peculiar to the residents of the South-Eastern Baltic region, once the province of East Prussia. Per Brodersen looked at the Sovietisation of Königsberg, and its transformation into Kaliningrad in socio-cultural, mental and toponymic terms [12]. Andrzej Sakson employed the comparative approach when analysing the socio-cultural characteristics of today's residents of Lithuania's Klaipėda County, Russia's Kaliningrad region and Poland's Warmian–Masurian Voivodeship — all of them former constituents of East Prussia [13]. East Prussian heritage in the infrastructure and cultural life of the study part of the Baltic [14], as well as various aspects of local memory politics and cultural memory [15] have been explored in several works.

This article draws on Pierre Nora's concept of *lieu de mémoire* (sites of memory) [16, p. 202—208] which has been extensively used in memory studies [17—21]. Sites of memory create a symbolic 'framework' for cultural memory, which is both a symbolic form of conveying and foregrounding cultural meanings, irreducible to individual and group experience, and a continuous process of maintaining society's identity through reconstructing its past [17, p. 37, 38; 21, p. 26].

Current research in the humanities tends to focus on the politics of memory practices, which aim to adjust or shape the existing image of the past in mass consciousness. It also explores the role of cultural memory in shaping social reality [22—24]. The relationship between cultural memory and identity has also been thoroughly investigated, along with the problem of using elements of cultural memory in ensuring the 'ontological security' of the state and society [25, p. 134]. Several authors have emphasised the significance of studying local and group-specific narratives about the past for understanding to which extent and in what manner the 'greater Russian narrative' is present in the historical

consciousness of residents of selected regions [24, p. 8—10; 26—28]. Another important line of research is the exploitation and reformatting of memorial objects dating back to earlier periods, including the Soviet era, in constructing national identity (see [26]). Some works have also looked at how the perceptions of monuments and other memorial objects evolve as generations change [27; 28]. Researchers from Kaliningrad have considered from the perspective of symbolic space reformatting/recoding what trends are dominant in the Baltics', Poland's and Ukraine's politics of memory amid the mounting political crisis [29—31].

German sites of remembrance

The memory of the Kaliningrad region's German past is the part of the local 'cultural horizon' most visible to the outside observer. It is present in urban and rural architecture informing tourist products and popular narratives about the region's past, as well as offering possibilities for commercial gain. Kaliningrad is rich in places of remembrance that hold value for Germans who once lived in East Prussia, their descendants and German citizens in general. These are memorial sites (monuments, commemorative plaques and stones) and architectural structures (churches, manors, castles), which can be divided chronologically into pre-war and post-war sites, most of the latter originating in the post-Soviet period. The 'German' sites can be further categorised into several types depending on the persons, groups or events that they commemorate.

1. *Monuments to German public officials and politicians.* There are few memorial objects of this kind in the region. During the East Prussian offensive and the first years after the war, almost all monuments to prominent figures in the Teutonic Order, Prussia and the German Empire have destroyed or dismantled. The bas-reliefs on the façade of the Kings' Gate (King Ottokar II of Bohemia, who is credited with building in 1255 what would later become the Königsberg Castle, Albrecht of Hohenzollern, the founder of the Duchy of Prussia, and the first Prussian King Friedrich I) were preserved, albeit in a badly damaged state. During the reconstruction of the gate, timed to coincide with the 750th anniversary of the city celebrated in 2005, the sculptures were restored and re-installed on the façade. The bas-relief of the Prussian generals Gerhard Johann David von Scharnhorst and August Neidhardt von Gneisenau have survived on the façade of the Rosgarten Gate; the portraits of Prussia's Minister of War Leopold Hermann von Boyen and General Ernst Ludwig von Aster are still to be seen on the Brandenburg Gate.

Busts of the philosopher Karl Marx, the author of *The Communist Manifesto* and *Capital*, and Ernst Thälmann, a German communist politician, were erected in Kaliningrad in the Soviet period in 1961 and 1977 respectively. Marx and Thälmann were the most celebrated figures in the German segment of the Soviet pantheon, which also included other prominent thinkers and working class movement leaders: Friedrich Engels, Karl Liebknecht, Rosa Luxemburg and Clara

Zetkin, to name a few. Both busts were created by the famous Soviet sculptor Boris Edunov. Today, the monument to Marx performs an educational and cultural rather than ideological function, reminding of the work and heritage of one of the greatest 19th-century thinkers, whose ideas had a tremendous impact on the modern history of Russia and the world. The bust of Thälmann, as well as the street and garden square bearing his name, perpetuates the memory of a leader of the anti-fascist movement and anti-Hitler resistance in Germany.

In the post-Soviet period, Kaliningrad commemorated Albrecht Hohenzollern, the last Grand Master of the Teutonic Order, the founder of the Duchy of Prussia and the University of Königsberg. A monument to Albrecht, sculptured by Fedor Morozov, was put up near the Kaliningrad Cathedral in 2005. A copy of the sculpture created by Johann Friedrich Reusch in 1891 lost in the early post-war years, it was relocated to the site where a building of the University of Königsberg once stood thus emphasising the role of Albrecht as the founder of the institution. In 2011, a memorial stone to Albrecht appeared in Sovetsk, its inscription naming him the duke who granted city rights to Tilsit in 1552. The stone is found on the square that was named after the duke before the war. The name of Albrecht Hohenzollern is also associated with close diplomatic contacts with the Russian state, as well as joint military and political actions taken against the Grand Duchy of Lithuania and Poland in the first third of the 16th century.

In 2005—2008, statues of two Teutonic Order commanders — *Komtur* of Balga Friedrich von Zollern and Grand Master Siegfried von Feuchtwangen — were restored.

2. *Monuments of German artists and scientists.*

Several sites in Kaliningrad commemorate the University of Königsberg (Albertina) and its professors. The university had a pivotal role in the development of Russian science and education in the 18th century, as well as in the history of European Enlightenment and philosophical thought.

In the Soviet period, in 1975, a memorial plaque honouring Friedrich Bessel (1784—1846), an outstanding scientist and astronomer, an honorary member of the St. Petersburg Academy of Sciences, was installed in Kaliningrad on the site of the Königsberg Observatory, where a bust of the scientist once stood.

Immanuel Kant (1724—1804), one of the most influential philosophers of the Modern era and a prominent figure in the German Enlightenment, has received special attention. The most well-known monument to Kant in Kaliningrad is the bronze statue cast in Germany in 1992. Using a miniature model for reference, the sculptor Harald Haacke reproduced the lost 1857 monument by Christian Daniel Rauch. The restored statue was unveiled in 1992 and put up on the extant pedestal of the original monument. A vital part in the restoration was played by Countess Marion Dönhoff, in whose manor the original monument was hidden during the war. A memorial plaque to Countess Dönhoff, an icon of West German political journalism, was installed in the village of Kamenka (Friedrichstein until 1947), her family estate before 1945.

There are several other objects commemorating Kant in Kaliningrad: the tomb of the philosopher at the wall of the Cathedral (it has become a traditional meeting place for the researchers and admirers of Kantian philosophy), a memorial plaque on the site of the philosopher's house, a memorial plaque with quotes from Kant and a Kant bench at the World Ocean Museum. The late 1980s-early 1990s witnessed a growing interest in Kant from Kaliningrad intellectuals. At the beginning of the 21st century, the philosopher's name and image were integrated into tourist narratives and practices. In 2016, Tsentralny Island in Kaliningrad was officially renamed Kant Island. Today, Kant is the most recognisable and popular foreign figure in the region's pre-war history, among locals and visitors alike; his name has become somewhat of a tourist 'brand'. A memorial plaque to three Albertina professors — Ludvikas Rėza, Carl Burdach and Christian Jakob Kraus — was unveiled on the site of the Old Altstadt Cemetery in Kaliningrad in 2007. Its installation was initiated by the administration of the Immanuel Kant Russian State University (now Immanuel Kant Baltic Federal University) and the Consulate General of the Republic of Lithuania. The project was funded by a private benefactor, the poet and entrepreneur Boris Bartfeld.

The university past of the city is also commemorated by the monument to professors of the University of Königsberg, which was erected in 2014 on the site of the former Albertina Professors' Necropolis. The monument is shaped like an amphitheatre symbolising a university lecture hall. The central stele has a bas-relief of Duke Albrecht; below, there are 11 names of Albertina professors who worked at the university in the second half of the 18th and 19th centuries and were buried in the necropolis.

Dozens of artists epitomising Germany's cultural tradition were born, lived and worked in East Prussia. Many of them have been commemorated in the region's memorial space. A memorial stone honouring E. T. A. Hoffmann (1776—1822), a Romantic author of fantasy and graduate of the Albertina, appeared as early as 1990. Plaques and stones have been installed in tribute to Käthe Kollwitz (1867—1945), a celebrated artist, printmaker and sculptor; Friedrich Heitmann (1853—1921), a prominent architect, the person behind the 'Amalienau villa colony', who designed innumerable religious and public buildings, as well as private homes; Thomas Mann (1875—1955), a Nobel Prize winner, master of sophisticated prose and anti-fascist; poets Frieda Jung (1865—1929) and Johanna Ambrosius (1854—1939).

Sovetsk (formerly Tilsit) boasts plaques honouring the German early 19th-century poet Max von Schenkendorf (1783—1817), who was born and grew up in the town, and Johannes Bobrowski (1917—1965). A native of Tilsit, Bobrowski was called up into the Wehrmacht in 1939 and fought in the USSR. From 1945 to 1945, he was imprisoned by the Soviet Union, where he worked in the Donbas coal mines and on the reconstruction of the Rostov region. Having, moved to the GDR, he found employment in publishing; his poems appeared internationally, including the USSR.

In Kaliningrad, the only surviving pre-war monument of a German artist is that to Friedrich Schiller (1759—1805). A work of Stanislaus Cauer, it was put up in 1910. The first restoration took place in the early 1950s; in the 1960s, the monument was added to the list of heritage sites, remaining to this day under federal protection.

An unconventional place of remembrance is the memorial stone commemorating Ännchen von Tharau (Anna Neander, 1619—1689) installed at the town cemetery of Chernyakhovsk, where she was buried. Ännchen was the heroine of a poem by Simon Dach (1605—1659), who later became rector of the University of Königsberg. The verse was made into a song vastly popular in Germany in the 18th—19th century.

3. *Sites commemorating landmarks in German history.*

There are few surviving monuments in the region that commemorate specific events in the history of the German state. One of them is the memorial stone honouring the 200th anniversary of the Kingdom of Prussia. It was installed in 1901 near the village of Rosenberg (renamed Krasnoflotskoe in 1945, today part of Mamonovo). Seriously damaged, the monument was restored in 1994 at the initiative of the former residents of the village. At the moment, there are no inscriptions on the stone connecting it with the foundation of the Kingdom of Prussia. One engraving, in German, reads 'Rosenberg. 1368. Zum Gedenken [In commemoration]' refers to the year of the foundation of the village; the other, in Russian '25.03.45 Rosenberg byl nazvan Kransoflotskoe' states the date when the village was renamed to its current name.

Germany's politics of memory paid particular attention to the establishment of the Second Reich and the wars that provided Prussia with the dominant role in the process. Several places of remembrance have survived in the Kaliningrad region that once were part of this memorial narrative. In Pillkallen (today, the village of Dobrovolsk in the Krasnoznamensk municipality), a monument was erected in the 1870s to commemorate the victims of the 1860s—1870s' wars, whose outcome allowed the Prussian elite to found an empire. Prussia and the Russian Empire were strategic partners at that time, a circumstance that was conducive to the success of Prussian foreign policy in Europe. In 2012, four concrete crosses were put up near the village of Kalinino in the Nesterov municipality on the site of a lost monument honouring the Prussian victory in the war against France (1870—1871). A memorial stone and an oak tree commemorating the same event have survived in Sovetsk.

In 1869, Germany and the lands under its influence at the time began to erect a special type of monuments known as Bismarck Towers. These towers were built as a tribute to Otto von Bismarck, the Iron Chancellor, who played a central role in the German imperial historical narrative. In the Kaliningrad region, ruins of two such towers survive: one near the village of Gorino in the Neman municipality; the other, near the village of Krasnaya Gorka in the environs of Chernyakhovsk. In the Nesterov municipality, there are memorial stones commemorating

the visit of Kaiser Wilhelm II to those parts in 1903—1908 and celebrating his deer hunting prowess. The stones can be seen near the villages of Sosnovka and Dmitrievka, as well as in the Rominte Heath.

4. *Sites commemorating the history of East Prussian towns and communities; places of family remembrance.*

In the post-Soviet period, the interest in the past of the region's towns and villages has been steadily growing in Kaliningrad, evidenced by inordinate publications in the media, books and research periodicals. The fascination with local history manifests itself in commemorative activities as well: new places of remembrance have appeared in the region, establishing links between the past and the present.

Some of the new commemorative sites have been created on the initiative of, and funded by, former residents. One of them is the memorial stone dedicated to the late residents of Cranz (now Zelenogradsk). It was installed in the 1990s on the site of a German cemetery. In the same decade, a monument to the town of Schirwindt was erected on the site where it was once located: renamed Kutuzovo after the war, it no longer exists. The memorial features the town's coat of arms and an inscription in German. The monument erected in the village of Kostrovo, (Bludau until 1946) in the Zelenogradsk municipality has an inscription in German and Russian that reads 'In memory of the residents of Bludau district and all fallen German and Russian soldiers'.

Other sites commemorating the past of towns and villages have appeared at the instigation of local regional historians and public figures. For instance, a memorial stone was installed in the village of Nivenskoe to commemorate its foundation; it bears an inscription indicating the village's former name and the year of its foundation (Wittenberg 1542). A similar memorial stone was laid in the village of Kornevo (Zitten until 1945) in the Bagrationovsk municipality; another one was unveiled in the town of Mamonovo (Heiligenbeil until 1947) in 2001 to commemorate its 700th anniversary.

The pre-war architecture of East Prussian towns has commanded wide attention as well. The models of medieval Königsberg installed near a hotel in the resort town of Svetlogorsk and at the Kaliningrad Cathedral on Kant Island have been immensely popular with tourists. The latter, depicting the architectural landmarks of the 1930s' Königsberg,[1] was donated to Kaliningrad by the East Prussian Aid Society in 2012.

Memorial objects featuring elements of the pre-war names of local institutions comprise a particular group. A prime example is the hospital building in Ozersk, which has a plaque commemorating Fritz Richard Schaudinn (1871—1906), a German parasitologist and the co-discoverer of the syphilis pathogen. It also mentions that the hospital in Darkehmen (the name of the town before 1938) was named after the scientist. The building of the Sergey Rakhmaninov Musical College in Kaliningrad bears a plaque informing that, from 1921 to 1945, it housed the Friedrich Bessel Grammar School for Boys.

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[1] These are the Albertina University, the Königsberg Castle, the Cathedral, the warehouse district of Lastadie and the Exchange building.

The 'nostalgia-driven tourism' of the first post-Soviet decades gave rise to the creation or revitalisation of places of family remembrance by former residents of East Prussia or their descendants.

5. *International cemeteries, military graveyards and memorials.*

A remarkable manifestation of local memorial culture is international cemeteries where both German and Russian (Soviet) soldiers who fell in the world wars were interred. In 1994, *Volksbund Deutsche Kriegsgräberfürsorge* (German War Graves Commission) erected in Pravdinsk (Friedland until 1946) a monument to the residents of the town killed in the First and Second World Wars. It has an inscription in German and Russian, which reads 'We remember our dead'. In 1995, a stele appeared in the village of Veselovka (Bärwalde until 1847) with the inscription 'In memory of Bärwalde residents and all the Russian and German soldiers who fell here'.

In the 1990s, the construction of an international memorial cemetery commenced in Baltiysk; it was completed in 2000. Over 13,000 people were interred there, most of them Germans, civilians and soldiers who died at the beginning of 1945, and concentration camp prisoners, predominantly Soviet citizens. In 2001, the German War Graves Commission initiated the reconstruction of the former communal cemetery in Kaliningrad. Opened in 2003, it was granted memorial status. It became the last resting place for the civilians, German soldiers and POWs of different nations who died during the Battle of Königsberg and the August 1944 bombing of the city. The memorial is also a tribute to the Red Army soldiers who fell in East Prussia.

In 2014, a cross in memory of the late residents of Tilsit was erected in Sovetsk on the site of the former butchers' cemetery at the instigation of the local youth; the initiative was supported by the Sovetsk branch of the Young Guard of United Russia. The cross marks the location of an old town cemetery, whose last vestige disappeared after the war. Its plaque lists the names of the residents of Tilsit who had been buried at the graveyard, according to surviving records. There is also the so-called Forest Cemetery in Sovetsk — the burial place of those fallen in the battles of the First World War and the German soldiers and civilians who died in 1944—1945. The erection of the memorial was supported by the German War Graves Commission. Unveiled in 2006, it has a plaque listing the names of the German soldiers buried at the site. In the Nesterov municipality, near the village of Sovkhoznoe, there is a war memorial from the 1920s. To date, this is the region's largest communal grave of German and Russian soldiers fallen in the First World War.

A memorial stone commemorating the residents of Preußisch Eylau was laid in Bagrationovsk (the current name of the town) in 2008. The stone bears a Latin cross and the inscription: 'In memory of all citizens of Preußisch Eylau who died in the crucible of the Second World War. Installed at the expense of the survivors and their descendants'.

In addition to international cemeteries and monuments in memory of local residents killed in attacks, there are also sites commemorating German soldiers fallen in the First and Second World Wars.

The German war cemetery in Primorsk was reconstructed in 1996; over 1,600 soldiers who died in 1945 are buried there. In 1992, a German POW camp cemetery, which functioned in 1945—1949 was restored near the village of Mayovka in the Chernyakhovsk municipality.

On the one hand, many monuments created in the 1990s and 2000s by Germans or with their assistance embodied the 'spirit of reconciliation' and integration that prevailed at the time. On the other, they reflected attempts at memorialising the local population and the fallen Wehrmacht soldiers through compromise solutions, such as placing them in the wider context of local residents and mentioning Russian soldiers; this partly lifted suspicions about the possible rehabilitation of German servicemen.

Lithuanian places of remembrance

In the modern era, the territory of today's Kaliningrad region witnessed a significant development of Lithuanian national culture and the standardization of the language. The Balts — *Lietuvininkai* or the Prussian Lithuanians, newcomers from Lithuanian lands and the descendants of Prussians — accounted for a substantial part of the population of the Duchy of Prussia, which later became East Prussia, in the 16th-early 20th century. The term *Klein-Litauen* (Lithuania Minor) first appeared in the German chronicles of the 16th century to denote regions populated by both Germans and Lithuanians. Lithuania Minor spanned today's Klaipėda County and the eastern part of what is today the Kaliningrad region. Historically, the Kaliningrad region was considered an ethnographic region within East Prussia, but it did not have the status of cultural or administrative autonomy. German colonists came to settle there in numbers, and the territory was gradually Germanised. In the pre-war years, most Prussian Lithuanians identified themselves first as residents of Prussia and only then as Lithuanians [32, p. 20, 21]. Most of the region's population, both Lithuanians and Germans, left it before and during the Red Army's East Prussian offensive in the autumn of 1944 — spring of 1945. The remaining local population was resettled to the Soviet occupation zone of Germany in 1947—1949. In the Soviet period, the region's population had the largest percentage of Lithuanians among all RSFSR territories. Yet, with very few exceptions, these Lithuanians were newcomers from the Lithuanian SSR rather than descendants of Prussian Lithuanians.

Although the term 'Lithuania Minor' is widely used in the contemporary Lithuanian media and political discourse,[1] most of the region has never been part of the Lithuanian national state, with the exception of Klaipėda County, which was annexed by Lithuania in 1923 and later included into the Lithuanian SSR.

Most of the few Lithuanian places of remembrance in the Kaliningrad region are linked to the 16th—19th-century landmarks in the history of Lithuanian culture.

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[1] Who will remind Russia that Kaliningrad doesn't belong to it any more? 2014, *Delfi,* URL: https://www.delfi.lt/ru/news/live/kto-napomnit-rossii-chto-kaliningrad-ej-uzhe-ne-prinadlezhit.d?id=65889068 (accessed 05.05.2020).

In Kaliningrad and Neman, there are memorial plaques to Martynas Mažvydas (1510—1563), a Lutheran pastor from Ragnit (today, Neman), writer and alumnus of the Albertina. In 1547, he published the first printed Lithuanian book *Catechismusa Prasty Szadei* (The Simple Words of Catechism), which lay the foundation for the Lithuanian written tradition. The dawn of Lithuanian literature is closely linked to the name of the poet Kristijonas Donelaitis (1714—1780), the author of the poem *Metai* (The Seasons). He served as a pastor at a Lutheran church in the village of Tolmingkehmen (now Chistye Prudy in the Nesterov municipality). A Donelatis museum opened in the village in 1970 as a branch of the Kaliningrad Museum of History and Fine Arts. It consists of the Lutheran church, near which a memorial stone was laid, and the pastor's house. In 1989, a memorial plaque was installed to mark the birthplace of Donelaitis; in 2004, a monument to the poet was unveiled in the town of Gusev.

'The Seasons' was published posthumously at the beginning of the 19th century by the Protestant pastor, professor at the University of Königsberg, a scholar of Lithuanian folklore and a translator of the Bible into Lithuanian, Ludvikas Rėza (1776—1840). In 2005, a monument to Rėza was unveiled in Kaliningrad, becoming the centrepiece of Lithuanian Square.

Prominent figures in East Prussia's Lithuanian culture were the philologists Fridrichas/Friedrich (1806—1884) and Aleksandras Kuršaitis/Alexander Kurschat (1857—1944). In honour of their contributions, a plaque was unveiled in 2009 in the town where they lived and worked, which is now known as Zelenogradsk. Friedrich Kurschat, a professor at the University of Königsberg, dedicated his studies to the grammar of the Lithuanian language. He worked on and published German-Lithuanian and Lithuanian-German dictionaries. He was also a co-founder of the Lithuanian Literary Society. Alexander Kurschat, a teacher at the Tilsit gymnasium, prepared a new Lithuanian—German dictionary. He moved to Germany after retirement.

Pranas Domšaitis (Franz Karl Wilhelm Domscheit, 1880—1965), a German expressionist artist of Lithuanian descent, was born in the village of Kropiens (now Gaevo in the Guryevsk municipality) and graduated from the Königsberg Academy of Fine Arts. In the 1930s, he became friends with the artist Emil Nolde, a member of the Nazi Party at the time. At the end of the decade, Domšaitis's pictures, along with those of Nolde, were displayed at the Degenerate Art exhibition; his works were heavily criticised in Germany. In 1949, he emigrated to South Africa, where he continued to paint. At the joint initiative of the Consulate General of Lithuania, Klaipeda and Kaliningrad artists, a memorial plaque was placed in 2006 on the house where Domšaitis lived.

Another Lithuanian place of remembrance is the catholic church in the village of Bolshakovo in the Slavsk municipality (Groß Skaisgirren until 1938 and Kreuzingen in 1938—1947). The building, constructed in 1925, houses the St John the Baptist Parish, which belongs to the Catholic Church. A Catholic community was registered in the village of Bolshakovo as early as 1991.

Most of the objects commemorating Lithuanian culture are located in the east-
ern part of the region (Gusev, Bolshakovo, Sovetsk, Chistye Prudy and Neman),
i.e. within the former ethnographic area of Lithuania Minor, as well as in Ka-
liningrad. They commemorate distinct stages in the development of Lithuanian
linguistics, literature and philology in East Prussia, bringing to the fore the con-
tribution of Lithuanians to the region's intellectual life of the Modern era and the
development of European art. Moreover, they emphasise the role the region had
in the history of the Lithuanian language. The Catholic churches, albeit important
meeting gathering places for the Lithuanian community, do not always function
as 'places of remembrance'.

Polish places of remembrance

The list of memorial sites in the Kaliningrad region associated with Polish
national history is short. The northern part of East Prussia, which later constituted
the Russian region, was historically part of the 'Germanic world'. Considered a
'barbaric periphery' of Christian Europe before the Teutonic conquest, it did not
occupy a prominent place in the development of the Polish people, statehood or
culture.

However, Poland has preserved the memory of Adalbert of Prague, a saint
and missionary who died in Prussia in 997 at the hands of non-believers. In
1822, a wooden cross was erected in the village of Tenkitten (now Beregovoe in
the Baltiysk municipality) where it is believed that St. Adalbert was killed, as a
tribute to his courageous act of faith. In 1997, on the occasion of the thousandth
anniversary of Adalbert's martyrdom, a metal cross was erected at the same site,
which remains the primary place of remembrance for Catholic mission work in
the region.

After the war, Poland and the USSR had a shared memory of the struggle
against Nazism and Nazi crimes. Near the village of Hohenbruch (now Gromovo
in the Slavsk municipality), there was a camp where Polish intellectuals, mem-
bers of Polish national organisations, consular staff and prisoners from Czecho-
slovakia and the Soviet Union were held during the Second World War. In 2005—
2012, a memorial was built at the site. A memorial cross and two stones were
installed with inscriptions in Russian and Polish; another stone lists the names
of the Polish consular staff who died in Hohenbruch. The text on the memorial
tablet added at the initiative of the governments of the Kaliningrad region and
the Republic of Poland concludes with the words: 'In memory of all those who
suffered and died here'.

There are three other monuments commemorating Polish artists and scientists
who visited East Prussia at different times. Nicolaus Copernicus (1473—1543),
the author of the heliocentric model, visited Kaliningrad in a medical capacity at
the invitation of Duke Albrecht. A monument to Copernicus was put up near the
main building of the Immanuel Kant Baltic Federal University. Sculpted by Xaw-
ery Dunikowski, it was a gift to the Kaliningrad University from the Aleksander

Gieysztor Academy of Humanities and the Jagiellonian University. In 2010, Poland presented Kaliningrad with a bust of Frédéric Chopin (1810—1849) to mark the 200th anniversary of the Polish composer.

A statue of Adam Mickiewicz (1798—1855) was unveiled in 2015 in Zelenogradsk, which the celebrated Romantic poet visited in 1824. The local library took part in the creation of the monument. Not only did Mickiewicz make a major contribution to the development of Polish and Belarusian poetry, but he was an active member of the Polish national movement and political journalist. Devastated by the suppression of the 1830 Polish Uprising, he sought to create a Polish national legion to aid the allies in their fight against Nikolaian Russia during the Crimean War.

Summarising the review of the Polish places of remembrance, it is worth noting that, are heterogeneous in terms of style and meaning, these memorial objects do not create even a sketchy narrative of the Polish presence in the region's history.

Conclusions

Compared to some Eastern European states, Russia's Kaliningrad region seems a 'safe haven', a pocket of prudence and respect for the memory of the past: monuments from different eras and cultures coexist here, constituting the local memory landscape [29, p. 129—132]. This favourable situation is owed to the dedicated work of Kaliningrad historians, journalists, artists, and authorities over many years. They have been committed to creating an atmosphere of cooperation and integrating cultural heritage in the region. Isolated instances of memorial conflicts have not given rise to a major trend in the regional culture of remembrance. Unrestricted scientific and public discussion about local history, a common practice in the region, makes a sharp contrast to the Soviet decades. It has produced a coherent picture of the region's complicated past and helped Kaliningraders 'appropriate' a considerable part of the international historical and cultural heritage.

The memorial sites in Kaliningrad associated with international cultural heritage can be categorized based on different criteria, including their national affiliation (German, Polish, Lithuanian), the purpose of commemoration (monuments to public figures, memorials to historical events, military graves), their alignment with the official Russian historical narrative, and their integration into the regional cultural memory. By considering the last criterion, the local places of remembrance can be grouped into several categories with varying symbolic significance.

Firstly, there are monuments linked by the mass historical consciousness not so much to foreign as to domestic historical experience. These are, for example, monuments to Karl Marx, whose ideas had an enormous influence on Russia's modern and contemporary history or the communist Ernst Thälmann, a prominent figure in the Comintern and an icon of German anti-fascism.

Secondly, there are sites commemorating Russian history but closely connected to international narratives and integrated into various discourses, foreign, domestic and regional alike. A prime example is Kantian places. An outstanding German philosopher and Enlightenment thinker, the key personality in regional cultural memory and the most recognisable figure in the region's pre-war history, Immanuel Kant was a Russian citizen during the Seven Years' War. Although the memorial at the site of the concentration camp Hohenbruch bears witness to the Nazi crimes against Polish intellectuals, Soviet citizens were held prisoner at the camp as well, and Soviet troops fought in the area. Prominent personalities in German history and culture, Albert, Duke of Prussia, and the astronomer Friedrich Bessel are also part of Russian regional and national political discourse. The former was an ally of Vasily III of Russia in his fight against the Polish-Lithuanian state and the founder of the University of Königsberg; the latter was an honorary member of the St. Petersburg Academy of Sciences and promoter of European and Russian science.

Thirdly, some places of remembrance have a tenuous link to the Russian historical narrative, if any at all. They are barely integrated into the historical consciousness of Kaliningraders. These sites were either 'inherited' by the Russian region or created by enthusiast groups, local or international. Amongst them are monuments to the Franco-Prussian War, the sites commemorating the past of East Prussian urban communities, cemeteries and monuments to the German province's war dead, monuments to Lithuanian artists and intellectuals (a conspicuous exception is the memory of Kristijonas Donelaitis, whose memory was kept alive in the region in the Soviet period).

The 1990s witnessed the erection and revitalisation of innumerable sites commemorating the international and German periods of the region's history. The memorial activities reached their peak in the second half of the 1990s—2000s. Factors in the surge of commemorative efforts were 'nostalgic tourism' to Kaliningrad, Germany's close attention to the region, growing interest in the pre-war past from local residents and the work of local historians and enthusiasts. In December 1992, an agreement was signed between the Government of the Russian Federation and the Government of the Federal Republic of Germany on the maintenance of war graves, which laid a legal foundation for the restoration of German war graves and memorials. The development of the tourism industry, the commercialisation of the memory of the past and the celebration of the 750th anniversary of Kaliningrad in 2005 kindled interest in the pre-war past and encouraged the creation of new places of remembrance. The second decade of the 21st century saw a decline in memorial activities related to international historical heritage.

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