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Cross-border cooperation at the external border of the European Union in the context of political, economic and social conditions: the case of the Polish-Russian neighbourhood

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Abstract

Research background: Integration and globalization processes encourage activities for the development of border regions. For the north-eastern regions of Poland and the Kaliningrad region, cross-border neighbourhood enables regions to cooperate and provides an opportunity for economic and social recovery.

Purpose of the article: The present article aims to analyse areas of cross-border activity taking place on the Polish-Russian borderland, based on the opinions of the inhabitants of the Kaliningrad region. Taking into account the rapidly changing political and economic conditions, as well as social relations, the following areas of Polish-Russian cross-border cooperation have been examined: economic activity, tourism, social activity, scientific cooperation, neighbourly relations.

Methods: The study presents the results of the author's own research carried out using standardized interviews with 1,022 inhabitants of the Kaliningrad region. As the research instrument, a self-designed interview questionnaire. The adopted time frame encompassed four stages of the functioning of Polish-Russian cross-border cooperation, each of them different due to political, economic and social conditions. The sample was selected using the quota method. The correspondence analysis was used for statistical tools.

Findings & Value added: The suspension of local border traffic has significantly limited the development of cross-border cooperation. The Polish-Russian relations, encumbered with high risk and uncertainty, have led to a considerable decrease in cooperation between border areas. The level of risk results not only from mutual relations between Poland and Russia, but is also a consequence of political and economic relations between the European Union and the Russian Federation. In the long term perspective, local border traffic may be open and similar conditions for the functioning of cross-border cooperation may occur. Therefore, knowledge about the activity of cross-border residents of Polish-Russian border regions will be useful in counteracting the undesirable effects that may occur.

Introduction

Modern day Europe has been shaped as a result of long-running processes of political transformations and common historical and cultural background. In an era of unification of Europe's countries and the enlargement of the European Community, integration processes and cross-border cooperation are becoming a significant aspect of its socioeconomic life. Europe's regional diversity constitutes its exceptional asset and has enormous potential. Cross-border regions are a platform thanks to which opportunities for cooperating on many levels are created. Borders have, to a large degree, ceased to perform the role of separating communities. However, in many cases, there are distinct economic and social differences among the neighbouring countries within the European Union. Those differences are particularly visible as regards the outer borders of the European Union with Eastern European countries.

Cross-border cooperation is considered to be one of the most significant elements of shaping civil society, for whom the crucial point of reference is the principle of subsidiarity and respect for human dignity. Fundamentally, this cooperation relies on the collaboration of border regions as well as on transnational cooperation among regional and local governments and organizations representing border areas. There are two main aspects of the connection between cross-border cooperation and its impact on the development of border regions. First of all, these are the areas of cooperation implemented under cross-border programmes, and secondly, there are consequences of implementing cooperation from the point of view of the inhabitants of the regions. The creation of effective conditions for developing Polish-Russian cross-border cooperation should be taken into account while specifying the principles of its financing and implementation. Research concerning the influence of political, economic and social conditions on the development of cross-border cooperation, particularly at the lower level of aggregation, can constitute an important background for proposing solutions in the upcoming programs financed by the European Union (Medei-

ros, 2018). Strong economic interactions have an impact on the cross-border integration of the communities, measured by the percentage of inhabitants on the other side of the border (Decoville *et al.*, 2013). European Commissioner for Regional Policy emphasized that “changes aimed at creating a new, more flexible cohesion policy are necessary” (Cretu, 2018).

When analysing the development of Polish-Russian cross-border cooperation, it is necessary to focus on the issues concerning the impact of external and internal circumstances. Any changes as regards development depend primarily on political decisions, social and economic policies, the functioning of a market economy, and the integration processes in Europe. The relevant literature offers numerous theoretical considerations on the forms and directions of cross-border cooperation. The analyses available from researchers provide information about the social scope of selected phenomena connected with the functioning of cross-border cooperation. However, there is no research which describes and systematizes the opinions of the inhabitants of border regions as regards the functioning of cross-border cooperation and the potential directions in which it could develop.

In view of the above factors, the present article aims to analyse the areas of cross-border activity taking place on the Polish-Russian borderland, based on the opinions of the inhabitants of the Kaliningrad region. Taking into account the rapidly changing political and economic conditions, as well as social relations, the following areas of Polish-Russian cross-border cooperation have been examined: economic activity, tourism, social activity, scientific cooperation, neighbourly relations. The study presents the results of the author’s own research carried out using standardized interviews with 1.022 inhabitants of the Kaliningrad region. The pertinence of the research topic has been supported by the need to reorient the rules and conditions of carrying out and financing cross-border cooperation at the external border of the European Union.

The article is organized as follows. First, the study contains a literature review on the foundations of Polish-Russian cross-border cooperation and the determinants of its development. Then, the methodology applied in order to process statistically the result of questionnaire research is presented. Next, based on the obtained empirical results, the influence of political and economic conditions and social moods on the level of development of cross-border activities in the Polish-Russian borderland is presented and discussed. The final part of the article is devoted to conclusions.

Literature review

Cross-border cooperation

“The European Outline Convention on Transfrontier Co-operation between Territorial Communities or Authorities,” launched in Madrid on the 21st of May 1980, defines cross-border cooperation as “any concerted action designed to reinforce and foster neighbourly relations between territorial communities or authorities within the jurisdiction of two or more Contracting Parties and the conclusion of any agreement and arrangement necessary for this purpose.” The Council Regulation No 99/2000 of 29 December 1999 specifies that the aim of cross-border cooperation is first and foremost to: assist border regions in overcoming their specific developmental problems, encourage the linking of networks on both sides of the border, accelerate the transformation process in the partner States through their cooperation with border regions in the European Union or Central and Eastern Europe, and reduce transboundary environmental risks and pollution. The activities undertaken under cross-border cooperation are intended to reduce obstacles and conflicts among the inhabitants of border areas, thus enabling genuine, rather than merely formal, cooperation and coexistence of very different and culturally diverse communities, which relate to one another with respect, showing mutual appreciations of their identity and dignity (Giełda, 2015).

Cross-border cooperation is understood as neighbourly cooperation carried out in all areas of life, between border territories: regions, municipalities and other border territory entities (Szadkowska, 2010). The principal markers of this sort of cooperation are, then, a border and the area around it. Therefore, cross-border cooperation takes place when its territorial and personal scope is related to the proximity of a state border. There is a reference here to the location of the entities carrying out this sort of cooperation as well – they have to come from border areas.

The border regions are a special type of regions, the specificity of their development is determined both by the periphery and the functional dualism of the border, combining the functions of barrier and contact (Fedorov, Korneevets, 2008; Oding & Fedorov, 2009; Ogneva, 2014; Studzieniecki *et al.*, 2016; Verkholtantseva, 2009). These functions are not static; they have a specific dynamic element. Dynamics of change is most often characteristic of a border which acts as a barrier (Mezhevich, 2002). The contact function of the border affects the gradual development of cross-border cooperation, as long as effects resulting from the implementation of intergovernmental agreements are achieved. Under the barrier function of the border,

border municipalities that are not connected to border crossings remain on the outskirts, which limits the possibilities of economic diversification.

In a study conducted by Osmolovskaya (2002), it is justified that the events of recent years show that due to changes in foreign policy factors that affect the development of cross-border cooperation, the nature of relations between Russia and Poland has changed. The degree of implementation and the course of Polish-Russian cross-border cooperation reflect changes in the interaction of the Russian Federation and neighbouring countries. Due to the high dynamics of these changes, it is necessary to have scientific and methodological tools to quickly monitor transformation data and limit possible negative effects on the economic activity of cross-border regions (Blandinieres, 2004).

In the research devoted to border territories various approaches are considered (Ciok, 2004). One of them takes into account peripheral areas, which, from the point of view of geography, are territories located in the marginal zone of the structures of a given country, whereas from the economic perspective they exist beyond the place, zone or centre of the highest economic activity (Rykiel, 1990). In the geographic context, border territories are always peripheral zones, while in terms of economy, in specific circumstances, e.g. local border traffic, they can become the most developed areas (Ciok, 1990). The development of cross-border cooperation and cross-border links are the key factors making it possible to overcome the negative consequences of the peripheries of cross-border areas.

The essence of cross-border cooperation in tourism was considered in the publications by Zaitseva *et al.* (2016). In the literature, there are reflections on the role of the local border traffic in the development of retail trade on the example of the Kaliningrad region of the Russian Federation of border regions (Fedorov & Korneevets, 2008; Oding, 2009).

Evaluation the interaction of cross-border regions of different countries is very risky, because regions often:

- significantly differ in the nature of their external relations, depending on the degree of periphery in relation to the center of the state (Dementieva, 2000),
- act as competitors, because similar resources determine the production of homogeneous goods and services for the external market (Fatkhutdinov, 2005),
- are hostage to the political unpredictability of future border functionality and conditions for cross-border cooperation (Porter, 1990).

While the political conditions are an important factor in shaping mutual relations, the impact of the factors differentiating border regions (standards of living, work and income opportunities, prices of goods and services on

both sides of the border) undoubtedly contribute to the fulfilment of the need to reduce the existing disproportions. This is very often accompanied by a discrepancy between the spatial production and consumption of goods and services, which enforces the stimulation of border trade. In borderland areas, processes aimed at using the existing differences for economic goals and improvement of living standards are started very frequently (Werwicki, 1994). One of such processes is border trade, whose growth depends on the following factors: economic (different prices of goods, differences in population incomes), formal and legal (the possibility of crossing the border, control systems), infrastructural and technical (technical infrastructure and spatial accessibility) and organisational and behavioural (people's attitudes, quality of service, interpersonal relations, organisation of trade, entrepreneurship, readiness to travel and forms of trade) (Powęska, 2016).

The peculiarity of Polish-Russian cross-border cooperation

Polish-Russian border regions have significant potential for cooperation which, on the one hand, can include the multiplicative effect of concentration of the production of goods and services on a compact territory, especially in the context of the contact function of the border and, on the other hand, actively uses existing cultural, historical and economic differences to diversify production (Korneevets *et al.*, 2017).

What determines Polish-Russian cross-border cooperation are external and internal factors, including: the consequences of Poland's membership in the European Union and NATO structures, Poland's cooperation with international organisations and institutions, and the adoption of relevant legislation, the developing political and economic cooperation of the country with the United States, Poland's position on the annexation of the Crimean Peninsula by Russia, economic sanctions imposed on Russia by the European Union, and the unpredictability of the Russian system of economic governance.

The process of key importance to the implementation of Polish-Russian cross-border cooperation was enlarging the European structures eastwards, which resulted in a considerable socioeconomic recovery and growth in the areas bordering with Kaliningrad region. The implementation of joint cross-border projects resulted in the modernization of the existing border crossing points and the creation of new ones, establishing economic, cultural, sport, scientific and personal contacts among the inhabitants of border regions. The advantages of this cooperation include: improvement of the condition of the natural environment, modernization of public infrastructure and making it more efficient, growth of entrepreneurship, stimulation of

tourism, an increase in trade volume in border areas, and the development of cultural exchanges. Polish-Russian cross-border cooperation facilitates economic integration and the development of numerous sectors of the economy.

New geopolitical circumstances and socioeconomic conditions, resulting from the launching on the 27th of July 2012 of an agreement between Poland and the Russian Federation concerning local border traffic, created considerable changes on the Polish-Russian borderland. Those changes were visible in the decisions made by state and local government councils, the conduct of entrepreneurs and producers of goods and services, and the rapid development of tourist traffic, as well as in the attitudes of the inhabitants of border regions (Batyk, 2019). The local border traffic agreement included numerous changes of regulations on crossing the border and simplified the procedure of applying for a permit to cross the border. The popularity of local border traffic was reflected in the number of border-crossing permits issued and an increased traffic level. Based on the statistics of Polish Border Guard, in 2012 Russian citizens received 12,673 documents entitling them to cross the border in accordance with local border traffic, while in 2013 171,667 such documents were issued (*Statistics of the Border Guard Headquarters*, 2017).

The experiences of Polish-Russian cross-border cooperation, based on the last few years of active cooperation, contributed to an evolution of types of border regions from the point of view of their peripheral status. Positive changes occurred mostly in the areas of border municipalities and they resulted from the need to provide services to people crossing the border (petrol stations, cafes, shops, hotels, bed & breakfasts) and transit connections. The increase in tax income in the budgets of municipalities not only made it possible to solve various social tasks, but it also contributed to the diversification of the economies of those municipalities. The inhabitants' social activity was mobilized thanks to the functioning of local border traffic. Unfortunately, the political and economic conditions to a large extent limited the activity of the inhabitants of border areas.

The suspension of local border activity led to very big changes in the economic environment in border regions, and, above all, to a large extent it reduced border trade. The total economic losses from reducing the number of border crossings are estimated at 50 million euros for the Kaliningrad region and 20 million euros for the border regions of Poland (Korneevets *et al.*, 2017). As a result of the lack of decision concerning the resumption of border traffic, the border currently constitutes the greatest barrier to the development of cross-border cooperation, which will undoubtedly influ-

ence the directions and speed of diversification of the economies of border regions (Batyk, 2016).

When arguing in favour of undertaking cross-border cooperation at the Polish-Russian border, economic factors are of great significance, including the necessity of economic stimulation of border regions and the economic benefits expected by the inhabitants of these territories. Among the activities which contribute to such an outcome are: cooperation in the area of technical infrastructure (transport and communications network, border crossing system), growth of entrepreneurship, the creation of small production, trade and services companies, the development of tourism and flow of labour (Ogrodowicz, 1999). The border regions often act as competitors, since similar resources determine the production of similar tourism products and services (UNWTO launches a travellers' competition to promote sustainability, 2017). Mutual tourist exchanges depend on the diversity, uniqueness of services, their optimal correlation in price and quality, and also depend on the level of social and economic development on both sides of the border. The Polish regions offer a larger range of tourist goods and services in the Kaliningrad market than the Kaliningrad market in Poland. As a result, of the total number of Russian citizens crossing the border, about 14% of Russian citizens visit Poland for tourism purposes and only about 1% of Polish citizens visit Russia for the same purpose (WTTC: Report. Travel & Tourism. Economic impact, 2015). Therefore, the Kaliningrad region needs diversification of the tourist product, taking into account the interests of tourists from Poland.

The socio-cultural factor is an incredibly important prerequisite when undertaking activities aimed at the growth of cross-border cooperation. Joint activities are conducive to the creation of ties between local communities, and building and strengthening of mutual neighbourly relations. Polish-Russian cooperation can be a factor integrating border communities which have similar cultural traditions in common but are divided by the historical past. It enables getting to know cultures and bringing them together, contacts between people inhabiting areas on both sides of the border, including families and friends who have been separated.

While carrying out Polish-Russian cross-border cooperation, local authorities of border regions, focus their activities on the development of culture, education, sport and tourism. Such activities include: the organisation of cultural, tourist or sports events, picnics, fairs, exchange of representatives of various groups and walks of life (e.g. children, young athletes). Cross-border cooperation contributes to the elimination of inequalities and fears of otherness, overcoming of mutual prejudice, strengthening formal and informal interpersonal contacts between communities inhabiting

border areas, as well as reduction of apprehension, distrust and aversion towards foreigners. As regards Polish-Russian relations, the reduction of prejudices and their effects is a very difficult task. However, despite strong political influences and historical prejudices, the scope of cooperation suggests a wide range of activities carried out jointly by Polish and Russian partners.

Non-governmental organisations from both Poland and Russia, demonstrate a high level of commitment as regards cross-border cooperation tasks. The activities of such organisations are characterized by speed and efficiency of decision-making and innovative approaches to problem-solving. The most frequently realized cross-border projects included the organisation of conferences, training sessions, workshops, study visits, internships, plein-air and art exhibitions, as well as publishing (e.g. the launch of the Atlas of Non-governmental Organisations of the Kaliningrad Oblast) and promotional activities. Non-governmental organisations focus on activities aimed at shaping civil society, offering social aid, protection of natural and cultural heritage, which leads to local growth.

The above activities are a great foundation for planning the growth of cross-border cooperation. While the relations between government officials of Poland and Russia are not exactly supportive as regards developing mutual cooperation, the relations between Polish and Russian authorities at the local and regional levels are very good.

Research methodology

The results of primary research — interviews conducted with the inhabitants of the Kaliningrad Oblast — were also used to meet the objective of the study. The application of theoretical and empirical research methods in the article made it possible to diagnose areas of development of cross-border cooperation in the context of changing political, economic and social conditions. The above-stated objective provides a basis for formulating a research hypothesis:

Hypothesis: The political decisions more than economic and social conditions determine the development of activity in selected areas of Polish-Russian cross-border cooperation.

As part of the research project in the years 2012–2016, standardized direct interviews were carried out among 1022 inhabitants of the Kaliningrad Oblast. As the research instrument, a self-designed interview questionnaire

was used and was validated. The research was performed in a continuous cycle in the entire period of 2012–2016. A significant, and critical, limitation in the research was the rapidly changing geopolitical situation. Taking into account numerous factors, e.g. changes of currency rates or a ban on the import of agro-food products from, among others, European Union countries, it became necessary to distinguish several stages in the test, characterized by different factors influencing the Polish-Russian cross-border cooperation. Over the subsequent years, changes taking place under the pressure of situational factors have been considered as one of the determinants of the development of this cooperation. The role of situational factors is extremely significant, and that is why the introduction of the criterion of time in the project was justified by the circumstances in which the methodology was conceived. The division of the research into several stages made it possible to perform a comparative analysis.

The presented analyses and their assessment are to help define the profile of future cross-border cooperation at the external borders of the European Union. In the context of difficult geopolitical conditions, a change in the rules of functioning of border markets seems necessary and inevitable.

The research results were presented by means of multidimensional statistical analysis — correspondence analysis. It is an innovative approach to the presentation of the dependence of exogenous conditions and the effects of their impact on the economic environment and social relations. Although the research was performed in 2012–2016, there are reasons to analyze the data. In the future, the results may be used to define new rules and criteria for the functioning of cross-border cooperation at the external borders of the European Union. The research results may also serve as a signpost for other countries in implementing cross-border cooperation with the Russian Federation.

The adopted time frame encompassed four stages of the functioning of Polish-Russian cross-border cooperation, each of them different due to political, economic and social conditions:

- I stage – defined in the empirical part as A: VII 2012–I 2014; it began on the 27th of July 2012 – since the day the agreement was introduced on local border traffic between Poland and Russia, and ended in January 2014. It was a period in which the border traffic on the Polish-Russian border grew considerably, similarly to the activity of the inhabitants of border regions.
- II stage – (B): II–XII 2014. In February 2014 Russia banned the import of pork from Poland. Additionally, Russian sanitary services prohibited the supplies of dairy products and apples from Poland. In August 2014 Russia banned the import of numerous agro-food products from, among

others, European Union countries. Stage II lasted until December 2014, when the value of the Russian rouble fell sharply. What characterized the period was also a steady rise of border traffic and expenses incurred by Russians in Poland.

- III stage – (C): I 2015–VI 2016, was a period of relative stagnation of the currency market and of a prolonged ban on importing agro-food products from Poland to Russia. This period lasted until the 3rd of July 2016, i.e. the last day of the validity of the agreement concerning local border traffic. What characterized the period was a decrease in border traffic, the reduction of Russian spending and a considerable prevalence of expenses for non-food products.
- IV stage – (D): VII–XII 2016, began on the 4th of July 2016 (the visa waiver agreement on the Polish-Russian border was suspended) and lasted until 31 December 2016. A considerable decrease in local border traffic and of cross-border activities took place. It was a period of political tensions and hostile propaganda in the media, influencing the public sentiment.

The factor limiting the test was the way the respondent sample was selected and its size. All efforts were made to ensure that the sample is diversified and similar to the demographic structure of the inhabitants of the Kaliningrad Oblast. The sample was selected using the quota method. The interviews were conducted with the inhabitants of the Kaliningrad Oblast representing various groups, and the common feature of the community was having a document which authorized them to cross the Polish-Russian border. Each person participated in the study only once. Initial setting of the quota for the sample of respondents in the period under analysis concerned the criteria of sex, age, education and place of residence. They were close to the structure of the population under analysis, which was also established (*Russia Regions*, 2015). The above-mentioned quotas were maintained for the entire period under examination. The examination covered the whole territory of local border traffic.

Pearson's chi-square test for independence and correspondence analysis were applied in the research (Pearson, 1900). The χ^2 independence test was used to assess the relationship between two nominal variables whereas the χ^2 statistic was used to evaluate the test value. The test consists in comparing obtained empirical values with expected values which designate no relationship between variables. The relationship between the variables occurs only if the difference is statistically significant.

Correspondence analysis was used as the statistical tool to analyse the results of the test. It is a technique from a group of multidimensional statistical methods that examines the co-occurrence of variables. It consists in

reducing the dimensions of the problem under consideration. The correspondence analysis procedure includes the following steps (Jakimowicz, Rzeczkowski, 2016, 2019a, 2019b, 2020):

- Creation of a contingency table to describe the relationships between variables
- Calculations performed with the use of Statistica program, in order to illustrate the difference between the rows and the columns of the contingency tables.
- Verification of the presented null and alternative hypotheses
- Evaluation of eigenvalues and coordinate tables for rows and columns (simultaneous analysis of points representing row profiles and column profiles.
- Creation of a two-dimensional correspondence analysis chart (biplot) and graphical analysis of the co-occurrence of characteristics in the study.
- Analysis of inertia that measures the differences between row profiles and column profiles in comparison to average profiles.
- Marking of co-occurrence with appropriate envelopes.

In the examined sample, the balance was tipped slightly to women (51.2%), while men constituted 48.8%. The most numerous group were persons older than 54 (30.6%) and in the 25–34 age bracket (19%), while the least numerous group consisted of respondents in the 15–24 age bracket (15.3%). The largest group of respondents declared having vocational education (47.1%) and higher education (31.6%). 16.6% respondents obtained secondary education and 4.7% — primary education. Almost half of the respondents (49.2%) lived in cities with a population over 50 thousand (Kaliningrad), while 25.4% were rural dwellers and people living in cities with a population less than 50 thousand. The majority of respondents (47.4%) had 3–4-person households. More than 60% of those examined were professionally active: self-employed (18.9%), an employee of a state enterprise (21.2%), administration employee (23.3%), unemployed (16.6%), pupil/student (14%) or pensioner (6%). The differentiation of respondents concerned the average monthly income per person in the household: the largest group consisted of persons declaring an average monthly income per one person in the household at more than 25 thousand roubles (26.8%) to 10 thousand roubles (23.5%) and in the 20–25 thousand rouble bracket (20.7%). The least numerous group consisted of people whose income ranged from 10 to 15 thousand roubles (9.3%) and 15–20 thousand roubles (15.5%). 4.2% of those examined refused to disclose information about their income.

Results and discussion

Usually the results of correspondence analysis are presented on two-dimensional correspondence maps called biplots. In order to improve the readability of the presented maps, the following nomenclature has been adopted:

- A, B, C, D – test stages,
- E – economic activity assessed by cross-border trade, T – tourism, SA – social activity, S.C. – scientific cooperation, SR – neighborly relations,
- 1-5 – labels indicating the degree of activity in selected areas.

The first step in the research was carrying out the chi-square test of independence in order to determine the relevance and strength of the connection between the existing variables and to verify the assumption that Polish-Russian cross-border cooperation depends on the political and economic conditions and social relations (from now on referred to as p-e-s conditions), which requires considering the following hypotheses (Table 1):

H_0 : Political decisions determine the degree of development of activity in individual areas of cross-border cooperation less than economic conditions and social moods.

H_1 : Political decisions determine the degree of development of activity in individual areas of cross-border cooperation more than economic conditions and social moods.

In accordance with the calculations performed, the zero hypothesis should be rejected in favour of the alternative hypothesis, which means that Polish-Russian cross-border cooperation depends on p-e-s conditions. From the quantitative characteristics of the matrix constructed by empirical data it can be inferred that two dimensions make it possible to reproduce 98.18% of inertia (Table 2).

Figure 1 presents a two-dimensional biplot of dependencies between the development of selected areas Polish-Russian cross-border cooperation and the p-e-s conditions (Table 3). The analysis yields the following observations:

- In stages A (07.2012-01.2014) and B (02-12.2014), the conditions in which cross-border cooperation was carried out had a moderate, large, and very large influence (SA3,SA4,SA5) on the activity of the inhabitants of border regions, consisting in their participation in the initiatives realized on the Polish-Russian borderland and undertaking joint social activities. They influenced, to a large and very large degree (SC4,SC5), the development of scientific cooperation. The conditions, to a moderate and large degree (SR3,SR4), were conducive to making social ties and improvement of the hitherto existing neighbourly relations. The in-

creased activity in the indicated areas resulted mainly from the opening of local border traffic, facilitated border procedures, the favourable exchange rate of the Russian ruble and good relations between neighbouring regions.

- In stage D (07-12.2016), no influence of p-g-s conditions on economic activity assessed by cross-border trade (E1) was noted, while they had a moderate effect (T3) on the development of tourism in border regions.

Economic activity assessed by cross-border trade

A very important determinant of the development of border regions is the economic activity of the inhabitants of these regions. In order to investigate the coexistence of the relationship between the p-g-s conditions and economic activity expressed by the activity of cross-border trade, the following hypotheses were verified (Table 4):

H₀: Political decisions determine the degree of development of economic activity assessed by cross-border trade less than economic conditions and social moods.

H₁: Political decisions determine the degree of development of economic activity assessed by cross-border trade more strongly than economic conditions and social moods.

According to the calculations performed, the zero hypothesis should be rejected in favour of the alternative hypothesis, which means that the p-e-s conditions have a significant impact on the development of economic activity. From the quantitative characteristics of the matrix constructed by empirical data it can be inferred that two dimensions make it possible to reproduce 99.85% of inertia (Table 5).

Figure 2 presents a two-dimensional biplot of dependencies between the p-e-s conditions and the development of economic activity assessed by cross-border trade (table 6). The analysis yields the following observations:

- In stage A (07.2012-01.2014) the conditions in which cross-border cooperation was carried out to a very large degree (E5) influenced the development of economic activity. The very high economic activity on the Polish-Russian border was influenced by: the possibility of using local border traffic, good border infrastructure, facilitated visa and border procedures, favourable exchange rates and very high interest of Russians in goods from Poland, mainly agri-food products.
- In stage D (07-12. 2016) the conditions in which cross-border cooperation was carried out had no influence (E1) on the development of economic activity. The lack of activity in the economic area was the result of the ban on the import of agri-food products from Poland to Russia

and the deepening political tensions and media propaganda which influenced the social relations.

The research has shown a significant correlation of the impact of local border traffic on economic activity expressed by the activity of cross-border trade. The greatest development of economic activity on the Polish-Russian border was in 2012–2014 (It follows from Figure 2, where the distance between points A and E5 is very small). The increase in economic activity in the affected facilitate border crossing and cost effectiveness purchases, which resulted from the exchange rate. Many Russians came to Poland to buy agri-food products, the prices of which in the Kaliningrad region were several times higher. The results are consistent with the opinions obtained in the research of the Center for Polish-Russian Dialogue and Understanding (*Local border traffic in the right direction*, 2013).

Economic activity is reflected in the level of economic development of border regions. Diversification of the economy of regions involved in cross-border cooperation results mainly from the development of cross-border trade in goods and services. This is in line with the results of studies by other authors, who argue that given the multiplier effect, cross-border trade has increased production in industrial and related service sectors.

Restrictions on the import of agri-food products from the EU countries, introduced by Russia in 2014, significantly contributed to the decline in the dynamics of Polish exports of these goods to Russia. Moreover, the political and economic conditions discouraged Polish companies from trading with Russia. The concerns of Polish entrepreneurs concerned the permanent changes to veterinary and phytosanitary regulations introduced by the Russian control authorities, as well as the threats related to the loss of financial liquidity by Russian contractors and the increased risk of their insolvency. Domestic demand in the Russian market has decreased since 2014, as a result of the decline in income and loan availability, as well as the devaluation of the ruble. Additionally, the demand for imported goods has weakened under the influence of the anti-import policy pursued by the Russian authorities (Batyk, 2018).

Presented statistical data indicate an increase in the correlation between local border traffic and economic activity, especially that related to border trade. The results of the research for 2014 indicate very high activity in the cross-border trade of the inhabitants of the Kaliningrad region, which is in line with the research by Afanassenko (2015), which shows that in 2014 Russian consumers reduced the frequency of purchases and expenditure on food products purchased in Russia. The suspension of imports to Russia resulted in the unavailability of agri-food products in legal retail trade. The embargo did not cause a complete lack of Polish goods on the Russian

market. Paradoxically, the availability of them in cross-border trade increased, where the prices of products from Poland were several times lower than the prices of goods offered in Russian trade establishments. The fall in the value of the Russian currency did not significantly reduce the competitiveness of Polish goods in relation to domestic products.

In 2015, compared to the period 2012–2014, there were significant changes in the relationships between the variables. Economic activity on the Polish-Russian border was very weak, which is reflected in the relatively large distances between point C and points E3 and E4 (Figure 2). The results are a confirmation the research by Zaitseva *et al.* (2016) and show significant differences in Polish-Russian cross-border cooperation. Research confirms that cross-border economic activity is strongly dependent on political decisions related to the suspension of local border traffic. Economic activity on the Polish-Russian border was the strongest in period A, which coexisted with point E5. On the other hand, in the B period we can observe an unfavorable change in the form of an increase in the distance of this point from the point E5. In period C the situation deteriorated, because E5 is basically a secluded point, located at large distances from points E2, E3 and E4. In period D, near E1 point, economic activity at the border is the lowest in the entire study. Overall, the unfavorable changes consisted in the gradual shift of points B, C and D from point E5.

Palmowski and Fedorov (2020) showed that in the years 2014–2019 political factors prevailed over socio-economic factors, which negatively affected the development of border regions. These opinions are consistent with the obtained research results, which show that subsequent political decisions (embargo, closure of local border traffic) negatively influenced the economic activity of the borderland inhabitants. Objective laws of the world market can intensify mutual economic relations, provided that the influence of political decisions is minimized. The development of border markets can contribute to increasing international competitiveness on both sides of the border.

Research confirms that economic activity expressed by the activity of cross-border trade and tourism are strongly dependent not only on the barrier function of the border, but also on political decisions that determine the import and export of certain groups of goods, currency fluctuations and other adverse factors, which confirms opinion Zaitseva *et al.* (2016). Despite the fact that the local border traffic between the Kaliningrad region and neighboring Polish regions, which operated in 2012–2016, has not been restored, there are large mutual tourist flows.

Tourism

The second important determinant of the development of border regions is tourism. In order to investigate the coexistence of the relationship between the p-g-s conditions and the development of tourism, the following hypotheses were verified (table7):

H₀: Political decisions determine the level of tourism development in border regions less than economic conditions and social moods.

H₁: Political decisions determine the level of tourism development in border regions more than economic conditions and social moods.

According to the calculations performed, the zero hypothesis should be rejected in favour of the alternative hypothesis, which means that the p-e-s conditions have a significant impact on the development of tourism. From the quantitative characteristics of the matrix constructed by empirical data, it can be inferred that two dimensions make it possible to reproduce 99.54% of inertia (Table 8).

Figure 3 presents a two-dimensional biplot of dependencies between the p-e-s conditions and the development of tourism (Table 9). The analysis yields the following observations:

- In stage A (07.2012-01.2014) and C (01.2015-06.2016) the conditions in which cross-border cooperation was carried out to a large degree (T4) influenced the development of tourism.
- In stage B (02-12.2014) the conditions in which cross-border cooperation was carried out to a very large degree (T5) influenced the development of tourism.
- In stage D (07-12. 2016) the conditions in which cross-border cooperation was carried out to a small impact (T2) on the development of tourism.

Tourism developed best in period B, as evidenced by the relatively small distance between this point and point T5. In periods A and C, the tourist traffic is at a slightly lower level, which results from the mutual location of points A, C and T4. In period D there is a regression in tourism, because point D is very far from points T4 and T5. The proximity between points D and T2 confirms only a significant decrease in the intensity of tourist traffic in period D compared to periods A, B and C.

The literature contains considerations on the role of the local border traffic in the development of border trade and tourism, based on the example of the Kaliningrad region of the Russian Federation (Fedorov & Korneevets, 2008; Oding, 2009; Anisiewicz & Palmowski, 2014; Studzienicki *et al.*, 2016). Since 2012, tourism has been one of the main destinations for the residents of the Kaliningrad Oblast to travel to Poland.

Russians' demand for Polish commercial, accommodation, gastronomic and even medical services has increased. The simplified visa system and the development of transport and tourist infrastructure contributed to the increased role of tourism in cross-border cooperation. The research results confirm the opinion (Anisiewicz & Palmowski, 2014) that tourism may turn out to be an important factor contributing to further dynamic progress in the dimension of cross-border cooperation.

In the border areas of both countries there are small restrictions in the development of tourism due to the strategic functions of these areas. The Polish-Russian border area included in the local border traffic zone has increased tourist traffic, mainly from Russia to Poland. The results of the research are the basis for the opinion that tourist activity generated the intensity of border traffic, which was one of the symptoms of social activity. - Cross-border tourism activity has been less affected by international perturbations, the crisis in Polish-Russian relations and fluctuations in the currency market.

Social activity

Another determinant of the development of border regions is social activity. In order to study the coexistence of the relationship between p-g-s conditions and social activity, the following hypotheses were verified (table 10):

H_0 : Political decisions determine the level of development of social activity of inhabitants of border regions less than economic conditions and social moods.

H_1 : Political decisions determine the degree of development of social activity of the inhabitants of border regions more strongly than economic conditions and social moods.

According to the calculations performed, the zero hypothesis should be rejected in favour of the alternative hypothesis, which means that the p-e-s conditions have a significant impact on the development of social activity. From the quantitative characteristics of the matrix constructed by empirical data it can be inferred that two dimensions make it possible to reproduce 99.84% of inertia (Table 11).

Figure 4 presents a two-dimensional biplot of dependencies between the p-e-s conditions and the development of social activity (Table 12). The analysis yields the following observations:

- In stage A (07.2012-01.2014) the conditions in which cross-border cooperation was carried out to a moderate (SA3) influenced the development of social activity.

- In stage B (02-12.2014) the conditions in which cross-border cooperation was carried out to a large degree (SA4) influenced the development of social activity.
- In stage D (07-12. 2016) the conditions in which cross-border cooperation was carried out to a small extent (SA2) on the development of social activity.

The research results confirm a very strong correlation between political decisions and social activity of the inhabitants of border areas. The favourable conditions resulting from the functioning of the local border traffic led to increased activity in this area. Social activity was at a relatively high level in period A, as evidenced by the small distance between points A and SA3. It is also important that points A, SA3 and SA5 form a common cluster. Period B is comparable to period A, which is due to the very small distance between points B and SA4. In periods C and D, there was a significant decrease in social activity, as the points representing them moved significantly away from points SA4 and SA5. Points C and D are also placed at a great distance from points SA1 and SA2. As the research results show, the development of social initiatives in the Polish-Russian border areas depends mainly on the decisions of the central authorities.

The range of activities aimed at developing contacts is very wide and pertains to areas of culture, education, sport, health, social integration of senior citizens and protection of the natural environment, as well as cooperation with the Polish diaspora in Kaliningrad (*International cooperation of local governments and the priorities of Polish foreign policy*, 2013). According to Kurowska-Pysz *et al.* (2018), among the actors of cross-border cooperation, the implementation of social goals is the closest to local governments, which are best prepared for that. Examples of joint undertakings could be sports events and competitions (e.g. “The International Łyna-Ława Canoeing Rally”, The Kętrzyn-Prwdinsk bicycle rally, theatre and folk festivals, and thematic fairs (The Yantur tourism trade show in Kaliningrad). Among the initiatives carried out by local authorities and NGOs, particularly worth mentioning are: “Integration and Cooperation of 50+ People from Polish border regions with the Kaliningrad Oblast”, “Polish Culture Days in the Kaliningrad Oblast,” and “Nations’ Christmas Eve”.

An example of cross-border activities on the Polish-Russian borderland is the organisation of integration activities among the communities inhabiting border areas, such as meetings, fairs, sports events and other events of this type. The essence of these activities is exchanging experiences and mutually beneficial good practices. To give an example, Poles shared their experiences of aiding handicapped/disabled persons with organisations

from the Kaliningrad region. Russian partners are extremely interested in all kinds of solutions in this regard because the sphere of aid for people with disabilities is very poorly developed in the enclave (Romanowska & Samońłowicz, 2004).

Scientific cooperation

The awareness of the existing historical prejudices between the nations neighbouring on the Polish-Russian borderland contributed to the creation of cross-border ties encompassing the cooperation of youths, i.e. a group which is the least burdened with the negative experiences from the past. Together with cooperation in the field of culture and sport, the meetings of young people have become a significant platform for developing cross-border cooperation with the Kaliningrad region. Therefore, the following hypotheses were verified (Table 13):

H₀: Political decisions determine the degree of development of scientific cooperation less than economic conditions and social moods.

H₁: Political decisions determine the degree of development of scientific cooperation activity more strongly than economic conditions and social moods.

According to the calculations performed, the zero hypothesis should be rejected in favour of the alternative hypothesis, which means that the p-e-s conditions have a significant impact on the development of scientific cooperation. From the quantitative characteristics of the matrix constructed by empirical data it can be inferred that two dimensions make it possible to reproduce 99.95% of inertia (Table 14).

Figure 5 presents a two-dimensional biplot of dependencies between the p-e-s conditions and the development of scientific cooperation (Table 15). The analysis yields the following observations:

- In stage A (07.2012-01.2014) the conditions in which cross-border cooperation was carried out to a moderate degree (SC3) influenced the development of scientific cooperation. Scientific cooperation developed the most intensively in 2014, because after the launch of the local border traffic, many agreements were signed regarding the school and academic youth exchange.
- In stage C (01.2015-06.2016) and D (07–12.2016) the conditions in which cross-border cooperation had no impact (SC1) on the development of scientific cooperation. The suspension of local border traffic caused significant difficulties in crossing the Polish-Russian border. The need for visas and visa procedures, as well as worsening social relations, resulted in a lack of interest in scientific exchange.

Figure 5 shows that scientific cooperation was at a relatively good level in period A, as evidenced by the short distance of point A from points SC3 and SC4. In period B, the situation worsened significantly as the point representing this period moved far away from points SC3 and SC4. In periods C and D, this cooperation was at a very low level due to the short distance of points C and D from point SC1 and significant distance of C and D from SC3, SC4 and SC5.

Research shows that cooperation between educational units intensified in 2012. The reciprocal activities of the educational institutions included tourist, cultural and sports exchange and trips made by members of school youth organisations. As a result of the cooperation between Zbigniew Religa Post-secondary School in Olsztyn and the Faculty of Medicine of Immanuel Kant Federal Baltic University in Kaliningrad, school representatives took part in youth trips and exchange of experiences. Competition in vocational tournaments proved to be a superb form of shaping mutual relations. Youths took part not only in school initiatives but also cooperated using other platforms, for example, by being active in youth organisations. An important area of cooperation and creating new cross-border ties is scientific cooperation, carried out with partners from Immanuel Kant Federal Baltic University in Kaliningrad, while Poland is represented mainly by the University of Warmia and Mazury in Olsztyn and the University of Gdańsk.

University cooperation is expanding through an increasing number of institutes and departments interested in developing scientific and educational interaction. According to Palmowski and Fedorov (2019), the potential areas for further cooperation identified by scientists are an important step towards the successful development of very difficult Polish-Russian relations and building strong ties between the European Union and Russia.

Neighbourly relations

The last step was to verify the following hypotheses (table 16):

H₀: Political decisions determine the degree of development of neighbourly relations between inhabitants of border regions less than economic conditions and social moods.

H₁: Political decisions determine the degree of development of neighbourly relations between inhabitants of border regions more than economic conditions and social moods.

According to the calculations performed, the zero hypothesis should be rejected in favour of the alternative hypothesis, which means that the p-e-s conditions have a significant impact on the development of neighbourly

relations. From the quantitative characteristics of the matrix constructed by empirical data it can be inferred that two dimensions make it possible to reproduce 99.89% of inertia (Table 17).

Figure 6 presents a two-dimensional biplot of dependencies between the p-e-s conditions and the development of neighbourly relations (Table 18). The analysis yields the following observations:

- In stage B (02-12.2014) the conditions in which cross-border cooperation was carried out to a moderate (SR3) influenced the development of neighbourly relations.
- In stage C (01.2015-06.2016) and D (07-12.2016) the conditions in which cross-border cooperation had no impact (SR1) on the development of neighbourly relations.

Historical relations between Poles and Russians make full integration difficult, but the more frequent contacts resulting from the local border traffic significantly contributed to the development of neighbourly relations. After the EU sanctions against Russia, the relations between the inhabitants of Polish-Russian border regions have not changed significantly. Political decisions led to the suspension of local border traffic, and consequently had a negative effect on the development of neighbourly relations between the inhabitants of the border regions. Figure 6 shows that neighbourly relations have never been very good. Even in the best period A, the relations were merely correct, which results from the relative positioning of points A, SR4 and SR5. In period B, the situation was comparable to period A, as evidenced by the small distance between points B and SR3. The gradual deterioration of these ratios occurred in periods C and D, which was proved by the position of these points in relation to points SR1 and SR2. 60% of the Kaliningrad region's inhabitants declared neutral or positive attitude towards the Poles (*Attitude of Kaliningraders*, 2014). A survey by the All-Russian Public Opinion Research Centre (VTsIOM) showed that 51% of residents of the Kaliningrad District perceive Russian-Polish relations positively (*Report*, 2015). According to the survey of the Centre for Polish-Russian Dialogue and Understanding 55% of the Polish border regions have positive emotions related to Russians. Almost Poles (48,8%) The vast majority of Polish participants of the survey conducted by Sagan et al. (2018) in the counties covered by visa-free traffic considered the relations with Kaliningrad region good (48.8%) and 19.2% thought they were very good. Slightly more than 30% of Polish interviewees perceived neighbourly relations with Russia as neutral. Only 1,6% described the relationship as bad. The research presented here shows that the above assessment is too optimistic. The optimistic assessment of Russians may be influenced by the fact that cross-border exchange is more profitable for them than for the

inhabitants of Poland. The assessment of Poles living in border areas may also be strongly dependent not only on political conditions, but also on historical factors.

As Sagan *et al.* (2018) the impact of local border traffic agreement on the functioning of local communities is reflected also in the growth of interest in learning Russian language in Polish parts of the borderland. Interest in learning the language resulted from the desire to increase income by Polish entrepreneurs, the need to understand Russians and encourage them to use services in Poland. While the motivation to learn a neighbour's language has often been only economic, it may contribute to better collaboration in the future.

However, Decoville and Durand (2019) offer a new image of European cross-border integration and to draw the following conclusions. Cross-border regions in which the intensity of flows between neighbouring regions is high do not necessarily show a high level of mutual social trust between borderland inhabitants. There is no reciprocity with regard to the mutual social trust that people have towards their neighbours within cross-border areas.

Svensson (2015), describing the relations between the regions of Sweden, Norway and Russia, stated that spontaneous bilateral contacts are rare, except between a local government located directly at the border and usually two or three directly adjoining municipalities. Most of the communication takes place within the context of institutions (the Euroregions, micro-regions, inter-municipal associations, meetings arranged by regional level). The findings given in current paper contradict the opinions presented above. Such extreme conclusions have not been confirmed in the study presented here, which may be partly due to the fact that Poles and Russians belong to the ethnic group known as the Slavs. Nevertheless, Figure 6 proves that there is room for tightening Polish-Russian affairs and improving mutual relations. Active neighbourly relations between Poles and Russians result from greater historical, linguistic and mental closeness of both nations. Easy communication is very important for the development of neighbourly relations.

On the basis of the obtained results, the hypothesis — The political decisions more than economic and social conditions determine the development of activity in selected areas of *Polish-Russian* cross-border cooperation — was adopted. The conditions of cooperation at the level of border regions had the greatest impact on economic activity and the development of tourism. A significant effect of cooperation was the exchange of goods and services, and border trade.

Finally, from the perspective of discussion on the obtained results, it should be stressed that unpredictable and dynamically changing political, economic and social conditions, as well as the research area (EU external border), constitute a significant limitation in comparing the obtained results to other Polish and international studies. On the one hand, the research provides an innovative approach to the impact of many variables on cross-border cooperation at the EU's external border. On the other hand, there is no reference to research of the same kind by other authors, which can be therefore considered as additional value added of current contribution.

Conclusions

The functioning of local border traffic has led to a significant growth of border activities of the Kaliningrad region inhabitants. Local border traffic proved to be not only an important factor influencing the cross-border activity of the inhabitants of border regions, but it also became a tool of implementing cohesion policy at the national level, increasing the competitive potential of regions and local communities. This is especially important for the regions located on the outer border of the European Union, which, unlike other regions of the given country, have to tackle the problem of social exclusion and economic slowdown.

The growth of dynamic of border traffic and cross-border activities of the inhabitants of Polish and Russian border regions had a positive impact on the socioeconomic development and diversification of the economy of those territories, particularly in tourism and related sectors (trade, food, entertainment, hospitality and others). The change of the function of the border — from a barrier to a contact zone — may result in a higher degree of diversification of the economy of border regions and the tourist sector, and in a greater variety of opportunities as regards the shaping of cross-border relations and social ties.

Polish-Russian cross-border cooperation should constitute a significant element of international activity in a wider, European context, and it could also help the issue of economic integration, not just at the level of border regions. Sadly, Polish-Russian international relations, encumbered with high risk and uncertainty, have led to a considerable decrease in cooperation between border areas. The level of risk results not only from mutual relations between the neighbouring countries, but is also a consequence of political and economic relations between the European Union and Russian Federation. The crisis in the Polish-Russian relations that started in 2014 as a result of political factors has an impact on all domains of cross-border

cooperation, branches of the economy, and especially the inhabitants of border regions. Subjective foreign policy problems that arise contrary to objectively existing factors for the development of cooperation have negatively affect such development of Polish-Russian cross-border cooperation.

The analysis of the impact of political and economic conditions and social relations on the activity of the inhabitants of border regions in various areas of cross-border cooperation may constitute an element of identifying tools aimed at overcoming the negative effects of the peripheral location of Polish-Russian border regions. Studies on this topic are a source of knowledge on the possibilities of developing cross-border relations. This knowledge is necessary to develop regional development programs and strategies for border regions and communes. Taking into account the possible directions of changes in geopolitical conditions, it becomes necessary to diversify the economic effects associated with the impact of the border. Precise definition of the rules for the functioning of cross-border cooperation and possible activities taking place within it will have a significant impact on the socio-economic development of border regions, including the development of tourism and related industries (trade, food industry, tourism, etc.).

The current article has limitations, mainly related to the period of the research and the dynamically changing geopolitical conditions connected with it, as well as the very high unpredictability of the Russian authorities regarding political decisions of the international community. The obtained results cannot (due to the originality of the adopted research methodology, research area and spatial scope) be directly compared with any other previous studies for Poland or any international studies. Therefore, the added value of the research carried out as part of the project was, *inter alia*, demonstrating the interdependence between many variables determining the development of cross-border cooperation and determining the key factors determining cross-border activity at the external border of the European Union. Assessment of the impact of political, economic and social factors may be useful in the context of searching for new solutions for the implementation of cross-border cooperation.

In the future, establishing conditions for the development of cross-border cooperation should be taken into consideration while defining the principles of functioning of local border traffic. It is one of the key factors intensifying cross-border cooperation. An increase in cross-border activity contributes to more European unity. In the context of rising Euroscepticism, it seems necessary to look more critically at the actual cross-border integration, especially at the external borders of the European Union. This

will help discover its specific consequences for people living in border regions.

Research on the impact of political, economic and social conditions on the development of cross-border cooperation, especially at a lower level of aggregation, may constitute an important background for proposing solutions in subsequent programs financed from European Union sources. Therefore, it is obvious that the problem of an objective assessment of the prospects for the development of cross-border cooperation with the Russian Federation and cross-border exchange in the face of changing geopolitical conditions is still valid. Studies on this topic should be continued even in the event of limitations, which mainly include external factors such as: unpredictable political decisions, the economic situation and social relations.

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Annex

Table 1. Results of the verification of the null hypothesis regarding: The p-g-s conditions do not determine the degree of development of activity in selected areas of Polish-Russian cross border cooperation

χ^2 value	Degrees of freedom	Significance level (a)	p-value
1881,6	72	0.05	0.000
Decision	<i>Since $p < a$, H_0 needs to be rejected in favour of H_1</i>		

Source: own results with the use of Statistica 13.3.

Table 2. Correspondence matrix characteristic

Number of dimensions	Singular values	Eigenvalues	Percent of inertia	Cumulated percent of inertia	Chi-square distances (χ^2)
1	0,562	0,316	85,782	85,782	1614,036
2	0,214	0,046	12,404	98,186	233,394
3	0,082	0,007	1,814	100,000	34,130

Source: own results with the use of Statistica 13.3.

Table 3. Coordinates of the rows (the development of selected areas Polish-Russian cross-border cooperation) and the columns (the p-e-s conditions) with the mass and quality measures

Row	Dimension		Mass	Quality
	Axis 1	Axis 2		
E1	-1,155	-0,433	0,016	0,997
E2	-1,030	0,023	0,030	0,999
E3	-0,775	0,147	0,032	0,999
E4	0,041	0,453	0,036	0,983
E5	0,851	-0,172	0,086	0,999
T1	-1,361	-1,371	0,004	0,972
T2	-0,986	-0,946	0,015	0,991
T3	-0,417	-0,253	0,030	0,881
T4	0,178	0,121	0,077	0,904
T5	0,255	0,240	0,074	0,922
SA1	-0,670	0,114	0,036	0,994

Table 3. Continued

Row coordinates				
Row	Dimension		Mass	Quality
	Axis 1	Axis 2		
SA2	-0,295	0,014	0,060	0,989
SA3	0,378	-0,050	0,070	0,990
SA4	0,457	-0,046	0,032	0,964
SA5	0,312	0,004	0,002	0,915
SC1	-0,682	0,115	0,052	0,995
SC2	-0,130	0,013	0,074	0,999
SC3	0,513	-0,110	0,040	0,985
SC4	0,718	-0,097	0,024	1,000
SC5	0,732	-0,024	0,010	0,714
SR1	-0,702	0,103	0,048	1,000
SR2	-0,240	0,054	0,055	1,000
SR3	0,289	-0,043	0,052	0,955
SR4	0,647	-0,082	0,030	0,998
SR5	0,873	-0,222	0,014	0,973
Column coordinates				
Column	Dimension		Mass	Quality
	Axis 1	Axis 2		
A	0,565	-0,130	0,231	0,963
B	0,498	0,034	0,289	0,958
C	-0,425	0,294	0,274	0,995
D	-0,765	-0,293	0,206	0,999

Source: own results with the use of Statistica 13.3.

Table 4. Results of the verification of the null hypothesis regarding: The p-e-s conditions do not determine the degree of development of economic activity assessed by cross-border trade.

χ^2 value	Degrees of freedom	Significance level (α)	p-value
760,45	12	0.05	0.000
Decision	<i>Since $p < \alpha$, H_0 needs to be rejected in favour of H_1</i>		

Source: own results with the use of Statistica 13.3.

Table 5. Correspondence matrix characteristics

Number of dimensions	Singular values	Eigenvalues	Percent of inertia	Cumulated percent of inertia	Chi-square distances (χ^2)
1	0,823	0,677	91,008	91,008	692,069
2	0,256	0,066	8,835	99,843	67,186
3	0,034	0,001	0,157	100,000	1,195

Source: own results with the use of Statistica 13.3.

Table 6. Coordinates of the rows (the development of economic activity assessed by cross-border trade) and the columns (the p-e-s conditions) with the mass and quality measures

Row coordinates				
Row	Dimension		Mass	Quality
	Axis 1	Axis 2		
E1	-1,124	-0,506	0,080	0,996
E2	-1,028	-0,051	0,151	0,997
E3	-0,784	0,094	0,160	1,000
E4	0,009	0,458	0,180	0,995
E5	0,861	-0,115	0,429	1,000
Column coordinates				
Column	Dimension		Mass	Quality
	Axis 1	Axis 2		
A	0,886	-0,160	0,231	0,997
B	0,695	0,077	0,289	0,996
C	-0,689	0,331	0,274	0,999
D	-1,047	-0,369	0,206	1,000

Source: own results with the use of Statistica 13.3.

Table 7. Results of the verification of the null hypothesis regarding: The p-e-s conditions do not determine the degree of development of tourism in border regions.

χ^2 value	Degrees of freedom	Significance level (α)	p -value
334,17	12	0.05	0.000
Decision	<i>Since $p < \alpha$, H_0 needs to be rejected in favour of H_1</i>		

Source: own results with the use of Statistica 13.3.

Table 8. Correspondence matrix characteristics

Number of dimensions	Singular values	Eigenvalues	Percent of inertia	Cumulated percent of inertia	Chi-square distances (χ^2)
1	0,558	0,311	95,148	95,148	317,952
2	0,120	0,014	4,398	99,547	14,698
3	0,039	0,001	0,453	100,000	1,515

Source: own results with the use of Statistica 13.3.

Table 9. Coordinates of the rows (the development of tourism) and the columns (the p-e-s conditions) with the mass and quality measures

Row coordinates				
Row	Dimension		Mass	Quality
	Axis 1	Axis 2		
T1	-1,935	0,310	0,021	0,999
T2	-1,368	0,108	0,073	1,000
T3	-0,476	-0,202	0,151	0,989
T4	0,215	-0,059	0,384	0,965
T5	0,348	0,104	0,372	0,994
Column coordinates				
Column	Dimension		Mass	Quality
	Axis 1	Axis 2		
A	0,203	-0,137	0,231	0,956
B	0,413	0,164	0,289	1,000
C	0,207	-0,085	0,274	0,944
D	-1,079	0,037	0,206	1,000

Source: own results with the use of Statistica 13.3.

Table 10. Results of the verification of the null hypothesis regarding: The p-e-s conditions do not determine the degree of development of social activity.

χ^2 value	Degrees of freedom	Significance level (a)	p-value
201,92	12	0.05	0.000
Decision	<i>Since $p < \alpha$, H_0 needs to be rejected in favour of H_1</i>		

Source: own results with the use of Statistica 13.3.

Table 11. Correspondence matrix characteristics

Number of dimensions	Singular values	Eigenvalues	Percent of inertia	Cumulated percent of inertia	Chi-square distances (χ^2)
1	0,441	0,195	98,542	98,542	198,977
2	0,051	0,003	1,301	99,843	2,627
3	0,018	0,000	0,157	100,000	0,316

Source: own results with the use of Statistica 13.3.

Table 12. Coordinates of the rows (the development of social activity) and the columns (the p-e-s conditions) with the mass and quality measures

Row coordinates				
Row	Dimension		Mass	Quality
	Axis 1	Axis 2		
SA1	-0,680	-0,039	0,180	0,999
SA2	-0,293	0,042	0,299	0,996
SA3	0,380	-0,047	0,350	1,000
SA4	0,462	0,074	0,161	0,997
SA5	0,306	-0,108	0,009	0,992

Column coordinates				
Column	Dimension		Mass	Quality
	Axis 1	Axis 2		
A	0,460	-0,068	0,231	0,999
B	0,393	0,061	0,289	1,000
C	-0,414	-0,030	0,274	0,997
D	-0,513	0,029	0,206	0,997

Source: own results with the use of Statistica 13.3.

Table 13. Results of the verification of the null hypothesis regarding: The p-e-s conditions do not determine the degree of development of scientific cooperation

χ^2 value	Degrees of freedom	Significance level (a)	p-value
293,49	12	0.05	0.000
Decision	<i>Since $p < \alpha$, H_0 needs to be rejected in favour of H_1</i>		

Source: own results with the use of Statistica 13.3.

Table 14. Correspondence matrix characteristics

Number of dimensions	Singular values	Eigenvalues	Percent of inertia	Cumulated percent of inertia	Chi-square distances (χ^2)
1	0,525	0,276	96,004	96,004	281,759
2	0,106	0,011	3,947	99,951	11,584
3	0,012	0,000	0,049	100,000	0,143

Source: own results with the use of Statistica 13.3.

Table 15. Coordinates of the rows (the development of scientific cooperation) and the columns (the p-e-s conditions) with the mass and quality measures

Row coordinates				
Row	Dimension		Mass	Quality
	Axis 1	Axis 2		
SC1	-0,693	0,003	0,259	1,000
SC2	-0,129	0,012	0,372	0,995
SC3	0,518	-0,105	0,198	1,000
SC4	0,722	-0,047	0,121	0,999
SC5	0,758	0,421	0,050	1,000
Column coordinates				
Column	Dimension		Mass	Quality
	Axis 1	Axis 2		
A	0,518	-0,163	0,231	1,000
B	0,493	0,134	0,289	1,000
C	-0,517	-0,010	0,274	0,999
D	-0,583	0,008	0,206	0,999

Source: own results with the use of Statistica 13.3.

Table 16. Results of the verification of the null hypothesis regarding: The p-e-s conditions do not determine the degree of development of neighbourly relations

χ^2 value	Degrees of freedom	Significance level (α)	p-value
291,54	12	0.05	0.000
Decision	<i>Since $p < \alpha$, H_0 needs to be rejected in favour of H_1</i>		

Source: own results with the use of Statistica 13.3.

Table 17. Correspondence matrix characteristics

Number of dimensions	Singular values	Eigenvalues	Percent of inertia	Cumulated percent of inertia	Chi-square distances (χ^2)
1	0,531	0,282	98,830	98,830	288,129
2	0,055	0,003	1,058	99,888	3,084
3	0,018	0,000	0,112	100,000	0,326

Source: own results with the use of Statistica 13.3.

Table 18. Coordinates of the rows (the development of neighbourly relations) and the columns (the p-e-s conditions) with the mass and quality measures

Row coordinates				
Row	Dimension		Mass	Quality
	Axis 1	Axis 2		
SR1	-0,709	-0,029	0,241	1,000
SR2	-0,246	0,002	0,276	0,997
SR3	0,291	0,068	0,262	0,996
SR4	0,652	-0,003	0,149	0,998
SR5	0,901	-0,149	0,072	0,999
Column coordinates				
Column	Dimension		Mass	Quality
	Axis 1	Axis 2		
A	0,596	-0,079	0,231	1,000
B	0,436	0,073	0,289	1,000
C	-0,513	-0,001	0,274	0,998
D	-0,595	-0,013	0,206	0,998

Source: own results with the use of Statistica 13.3.

Figure 1. Biplot of dependencies between the development of selected areas Polish-Russian cross-border cooperation and the p-e-s conditions

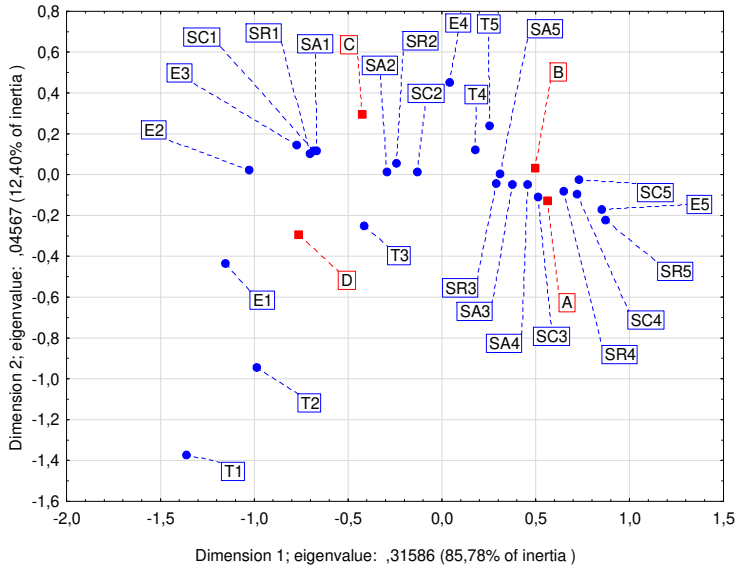


Figure 2. Biplot of dependencies between the p-e-s conditions and the development of economic activity assessed by cross-border trade

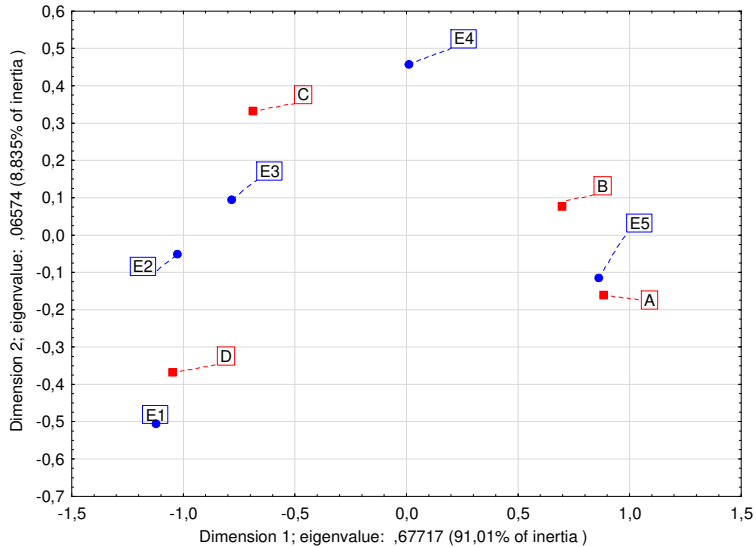


Figure 3. Biplot of dependencies between the p-e-s conditions and the development of tourism

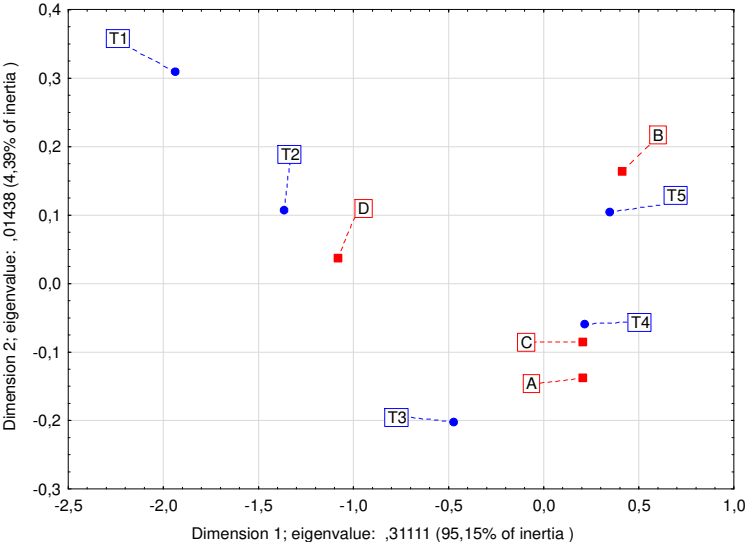


Figure 4. Biplot of dependencies between the p-e-s conditions and the development of social activity

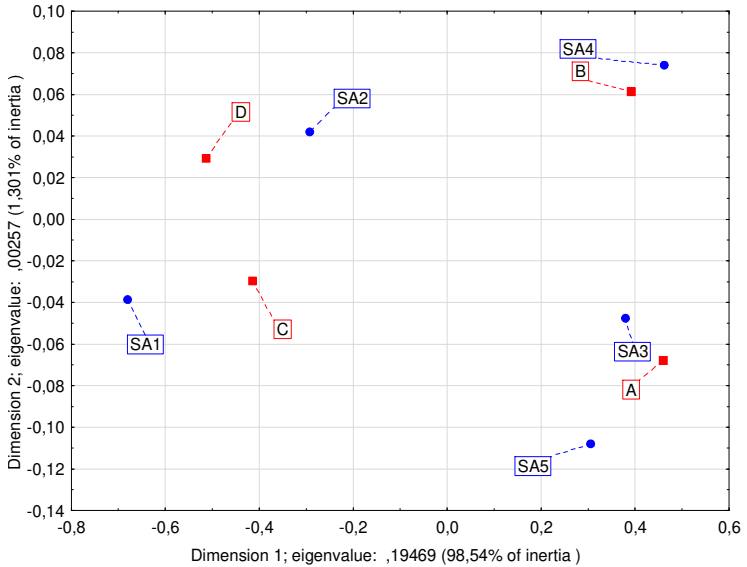


Figure 5. Biplot of dependencies between the p-e-s conditions and the development of scientific cooperation

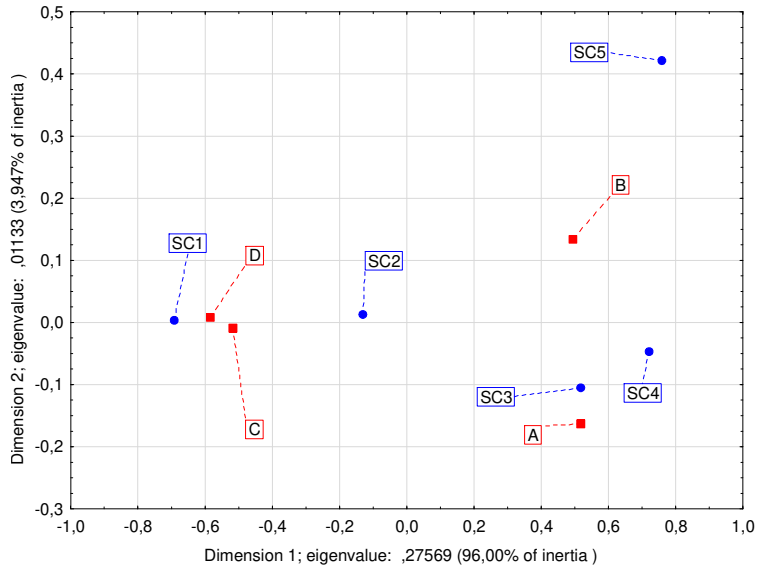


Figure 6. Biplot of dependencies between the p-e-s conditions and the development of neighbourly relations

