

# Asymmetry as a Factor Weakening Resilience and Integration in the Sustainable Development of the Polish-Czech Borderland in the Context of the Dispute About the Turów Mine

## Asymetria jako czynnik osłabiający odporność i integrację w zrównoważonym rozwoju polsko-czeskiego pogranicza w kontekście sporu o Kopalnię Turów

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### Abstract

By analysing asymmetry in socioeconomic and environmental development in the Polish-Czech borderland, we contribute to the discussion on its impacts as a factor weakening resilience and integration for the purposes of sustainable development in the region. In the article, we use the results of the studies under the Project *The crisis at the Turów Mine and its impact on Czech-Polish cross-border cooperation: An evaluation, conclusions and recommendations*, funded by the Polish National Agency for Academic Exchange in 2022. The main aim of our research is to draw conclusions for territorial self-governments as to how they should strengthen sustainable development based on integration with foreign partners, thus enhancing resilience. We draw conclusions based on qualitative research, statistical analyses and literature studies. One of the key conclusions which can be drawn from the present study is that the asymmetry visible in many socioeconomic areas weakens the resilience of institutional structures to crises, resulting in barely discernible cooperation between these regions.

**Key words:** Turów mine, quality of life, sustainable development, sustainability

**JEL Classification:** R11, O52, P28, P27

**Słowa kluczowe:** kopalnia Turów, jakość życia, zrównoważony rozwój, zrównoważoność

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### Introduction

The issues related to asymmetrical development of border regions have been widely addressed in literature and provide a background to the considerations presented here. There are two novel aspects here: resilience and cross-border integration in the case of the Polish-Czech borderland. The article was prepared using questionnaires carried out under the Project *The crisis at the Turów Mine and its impact on Czech-Polish cross-border cooperation: An evaluation, conclusions and recommendations*, funded by the Polish National Agency for Academic Exchange in

2022<sup>1</sup>. We assume that the main goal of these regions is to work towards sustainable development. This is a particularly difficult border region, since an open pit mine operating in this area has changed the image and landscape of region.

Firstly, we focus on analysing the Turów dispute. The operation of such a mine in Poland so close to the German and Czech territories has been criticised by environmental activists and the people living nearby. The mine causes air and noise pollution, soil subsidence and water shortages. Together with the nearby power plant (and the entire Polish national energy policy) it is not consistent with the EU environmental goals. The mine's lifespan was extended without environmental impact research or consultation on an international level. The dispute involved two principal positions: i) environmental protection and peaceful neighbourly relations and ii) the energy security of the local Polish populations and Poland as a whole. Over three years, the dispute became a clash of many local, regional, state, macroregional and global interests.

Secondly, we ground a broader background of the dispute in the cross-border socioeconomic asymmetry at local and regional levels. This is a significant factor weakening resilience and cross-border cooperation and integration in the region. In some cases, cross-border asymmetry functioned as a catalyst for the conflict.

The issues listed here are developed in this article: An analysis of the Turów crisis; Conceptual background and hypothesis development; Data collection and the research sample; Basic characteristics of the area; Empirical analyses and their results; Conclusion.

The article was prepared as a result of the work done by an interdisciplinary team consisting of Polish and Czech scientists.

## 1. An analysis of the Turów crisis

The Turów Mine has been operating since 1904 and the Turów power plant since 1962 (IZIDORCZYK, 2022). The problems began due to the continuous expansion of the mine, despite efforts taken to mitigate pollution (PGE 2022). The pit causes air and noise pollution, soil subsidence and groundwater drainage. According to the Czechs, 30,000 inhabitants in the borderland suffered from a lack of drinking water (DATEL & HRABÁNKOVÁ, 2020). Czech-Polish negotiations were held in the 2010s but no resolution was reached. A proposal to expand the mine and operate it until 2026 and potentially until 2044 was submitted in 2019 by PGE (Polska Grupa Energetyczna = Polish Energy Group). Polish authorities supported this plan without carrying out research or cross-border consultation, violating EU law and other regulations. PGE promotes the slow transformation of the Municipality of Bogatynia with the help of the EU's Just Transition Fund, ensuring Poland's energy security and local jobs. About 2,500 people work in the Turów mine, approximately 1,200 more are employed in the power plant and another 15,000 in cooperating subsidiaries (ŽUK & ŽUK, 2022).

Czech-Polish relations in the region worsened and very little common ground could be found. Several Czech municipalities, together with the Liberec Region and Greenpeace, petitioned the European Parliament (MĚSTO FRÝDLANT, 2019). The petition was found to be justified and this European Parliament support was influential in later court proceedings.

The Czech Republic successfully sued Poland over the mine in the ECJ (European Court of Justice). The ECJ fined Poland EUR 500,000 for each day mining continued. An agreement between Prime Ministers Petr Fiala and Mateusz Morawiecki was signed on 4 February 2022 (MINISTERSTVO ŽIVOTNÍHO PROSTŘEDÍ ČR, 2022). Poland paid the Czech Republic EUR 45 million in compensation and the Czech government withdrew its charges from the ECJ.

## 2. Conceptual background and hypothesis development

Interest in the issues related to border regions can be seen in numerous publications, often interdisciplinary in character (Cappellano et al., 2022; Cappellano & Kurowska-Pysz, 2020; Jakubowski, 2020; Knippschild & Vock, 2017; Nienaber & Wille, 2020; Ulrich, 2020; Wong Villanueva et al., 2020), and involve searching for possible sustainable development paths for these regions (Ilic et al., 2022; Ospanova et al., 2022; Thomas et al., 2012), which can differ fundamentally from central regions. We need to remember that the development of border regions depends to a large extent on national factors, both endogenous and exogenous, conditioned by the international environment. The difference in the development of border regions results, on the one hand, from a lower level of socioeconomic development and, on the other hand, from a different level of integration in the cross-border region and differentiated levels of asymmetry on both sides of the border. For the purposes of the Project, two different interpretations of cooperation and integration were adopted. As far as the research problems addressed in the Project are concerned, the term *cooperation* refers to institutions and their role in the mitigation of the dispute, while

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*integration* applies to labour flows and cross-border contacts. The sustainable development of the region is addressed in the article in three aspects: environmental, economic and social.

Border regions are classified as peripheral regions (problematic, less economically developed, often facing significant environmental problems caused by their failure to take care of the environment, the location of harmful industry, the post-military character of these regions, etc.).

Given the absence of large economic centres, border regions are often weaker economically than central regions of the country (Proniewski, 2014). Developmental shortcomings also result from poor infrastructure. In regions with open state borders, economic cooperation is a natural phenomenon, helping reduce deficits in socioeconomic development. These can take different forms of cooperation and integration. The problems of cross-border cooperation are particularly noticeable environmentally. The exploitation of natural resources often requires the cooperation of institutions, financial resources and a combination of different budgets. Clearly, in this area there is an absence of coordinated responses to the adverse impacts of economic activity and the crisis situations that followed. The idea of a *common good* is not always easy to communicate, particularly in border regions.

In the concept of sustainable development, the transformation of socioeconomic and political processes from *homo oeconomicus* to *homo cooperativus*, the evaluation of contemporary concepts of urban development (*smart city*, *eco city* and *compact city*), the conceptual framework is very important for the inclusive urban development model synergically taking into account their key values (Pięta-Kanurska, 2019; Przywojska & Podgórnjak-Krzykacz, 2020). In this case, two aspects are very important: The cause of the crisis and the solution to it; the resilience of a given economy enabling it to restore equilibrium. Economists propose that sustainable development goals should be perceived and taken into account as strategic conditions or restrictions in the building of companies' development strategies (Gorynia & Trąpczyński, 2022).

Cross-border cooperation generates a need to overcome disparities in economic development, legal conditions, other support instruments under the national policy, cultural and other differences. Institutions which strengthen the integration processes and mitigate the emerging conflicts play a very important role. Economic activity which causes damage to the environment is an area of potential dispute and discussed to the greatest extent. Residents cooperate to gain individual benefits, but not to strengthen the role of institutions working to support cross-border activities. In the case of integration, institutional cooperation is most often referred to. Unfortunately, in many of such regions a significant barrier to cooperation (Sohn, 2014) is the economic asymmetry. This translates to the absence of areas of cooperation between border regions. Cooperation is understood to mean mutual relations of institutional actors, while integration takes place at the level of the relations of the residents of a region. A primary feature of these regions is their peripherality constituting a barrier to their development. Development is also hampered by non-economic factors: environmental, social and even historical. In addition to the traditional tools of cooperation and integration, authors often point out the need to direct research so that it indicates opportunities for digital solutions to given problems (Łaźniewska et al., 2021; Merisalo & Makkonen, 2022).

Asymmetry is expressed as a gap in the socioeconomic development and long term it is related to the development of these regions. One measure of asymmetry can be economic competitiveness, demonstrating the socioeconomic gap between regions (Gorzelać, 2003; Łaźniewska & Gorynia, 2012). In terms of the contemporary development challenges, a measure of competitiveness is compliance with specific environmental standards associated with the concept of sustainable development (Łaźniewska et al., 2021).

Asymmetry in the socioeconomic development of border regions is an opportunity for mutual compensation of regional shortages at cultural, tourism and economic levels as well the labour market, services, etc. The existing development disparities can be a difficult barrier to overcome, limiting cross-border ties, particularly in institutional cooperation (Masik & Sagan, 2016; Opióła & Böhm, 2022), which creates the basis for integration. Important factors limiting the reduction of asymmetry include relations between neighbouring states, position in the international environment, institutional environment and associated conditions (related to the presence of an institutional and organisational gap), socio-demographic conditions (related to multiculturalism and unfavourable demographic processes), as well as economic conditions resulting from existing differences in economic systems and levels of development of borderlands (Komornicki et al., 2019).

H1: Asymmetry in the development of cross-border regions can be a significant barrier to deepening the cooperation process

Resilience to internal and external disturbances is related to the specificity of a given place. Central European cities and regions point out that, due to the existing path dependence, rooted, among others, in their post-industrial and post-Socialist legacy, building socioeconomic, environmental or institutional resilience requires a customised approach based on adaptation, modification of new ideas, concepts and solutions resulting from the impact of globalisation, digitisation, the green economy or the cohesion policy of the European Union (Drobniak & Plac, 2021). The popularity of resilience research is related to numerous crisis situations affecting the economies of the regions (such as the financial crisis, climate change, the Covid-19 pandemic etc.), the continuous evolution of the regional development drivers and the efforts to find formulas for adaptation and survival (Bristow & Healy, 2015). The concept of resilience has a long tradition in biological and engineering sciences; in the last decade it also

gained popularity in urban and regional sciences (Borsekova et al., 2018, 2021; Drobniak, 2018; Smętkowski, 2015). Definitions of the phenomenon of resilience can apply to man, society, ecosystem or city.

The scale and duration of disturbances are important elements of resilience research. In literature, the resilience triangle is referred to (Falasca et al., 2008). In the case of border regions, the crisis generating factors can have a global character, such as a pandemic, or be local – the Turów Mine. In terms of duration, we can speak of a sudden shock or a cumulative, slowly smouldering pressure, e.g. climate change (Drobniak & Plac, 2021). The sustainable development associated with the idea of green infrastructure strengthens the resilience of a given region and, conversely, the absence of transition tools for the local economic activities, translating into a deterioration of the environment, even on the scale of the entire region, weakens resilience (Korhonen et al., 2021; Rizzi et al., 2018; Szabó et al., 2018). Different types of institutions play important roles in building the resilience of a region. Innovative entrepreneurs create new activities, while institutional entrepreneurs introduce new rules and practices (Görmar et al., 2022; Grillitsch & Nilsson, 2022).

H2: Asymmetry in the socioeconomic development in a border region as a factor weakening resilience

### 3. Data collection, research sample and the characteristics of the sample

The Authors used triangulation of data sources in order to verify the research hypotheses (Saunders, M., Lewis, P. and Thornhill, 2012) and research methods. A combination of different methods and sources makes it possible to look at a wider picture of the phenomenon examined rather than single cases (Fusch et al., 2018). A quantitative analysis was complemented by qualitative individual and direct in-depth interviews. Since representativeness is not a priority for qualitative studies, their purpose is rather to provide a wider understanding of a given problem on the basis of a smaller number of cases (Glinka & Czakon, 2021). Interviews were held with representatives of local governments, the power plant and representatives of the Neisse-Nisa-Nysa Euroregion. Analysis covered the following actors:

- entities functioning in the Polish-Czech borderland (in the Neisse-Nisa-Nysa Euroregion) and involved in cross-border cooperation: 30 IDIs (15 IDIs with respondents from the Polish part of the Neisse-Nisa-Nysa Euroregion and 15 IDIs with respondents from the Czech part of the Neisse-Nisa-Nysa Euroregion);
- entities functioning in the Polish-Czech borderland (in the Neisse-Nisa-Nysa Euroregion) and involved in cross-border cooperation, as well as residents of the Neisse-Nisa-Nysa Euroregion. The spatial extent of the study: the Polish and Czech parts of the Neisse-Nisa-Nysa Euroregion. Methods: the CAWI and PAPI interviews. 70 respondents – Interreg beneficiaries (35 respondents from the Polish part and 35 respondents from the Czech part of the Neisse-Nisa-Nysa Euroregion), as well as 330 respondents – inhabitants of the Euroregion (180 respondents from the Polish part Euroregion and 150 respondents from the Czech part of the Neisse-Nisa-Nysa Euroregion). The sampling was purposive in the case of the representatives of the entities and random in the case of the residents. We can draw conclusions about the regions from which the sample was drawn and which are directly involved in the dispute. We can only assume that the results in other communes would be similar. Due to the lack of a sampling frame, deliberate selection of units for the sample was justified (the sample included both people living on the Polish and Czech sides of the Nysa Euroregion and in particular people who were familiar with the problem of the Turów Mine). The selection was based on a quota and all efforts were made to ensure that the research sample was the best possible representation of the entire population affected by the Turów problem. The size of the group assumes that the Polish side of the Nysa Euroregion is inhabited by about 600,000 people and the Czech side by about 500,000. To fulfil the condition of the group size for the study, a group of at least 318 people should be surveyed to achieve results with a confidence level of 95% (fraction size 0.5) and the assumed maximum error of 5% estimate of the true results in the population. Such a group was tested.

To ensure comparability between different countries, the questionnaire was designed in closed form using a five-point Likert scale. In drafting the questions, we followed well-known questionnaires (e.g. those of the World Value Survey, European Social Survey (Norwegian Centre for Research Data, Norway – Data Archive & distributor of ESS data for ESS ERIC, 2018). We also checked if there were no questions which had already been proved in other cross-country analyses. The questionnaire was prepared in Polish and Czech and its translation into Czech was prepared by native speakers. Care was taken to ensure exact translation of keywords and the context, too.

#### 3.1. The first group of respondents were the inhabitants of the region studied.

The main aim of the study was to show whether there is a cause-and-effect relationship between the dispute over the Turów mine and the cross-border relations in the Polish-Czech border area after the conflict emerged? The distribution of basic data on the Polish and Czech sides was as follows:

- a) The respondents on the Czech side were residents of the following towns:
  - Hrádek n. Nisou – 74,8%,
  - Chrástava – 10,4%,

- Heřmanice – 5,2%,
- Kunratice – 4,4%,
- Višňová – 5,2%,
- 100% of the respondents on the Polish side were from Bogatynia.

b) Summary of surveyed residents by gender

Table 1 presents the gender structure of the respondents for the Polish and Czech sides.

Table 1. List of respondents on the Polish and Czech sides by gender

gender	PL		CZ	
women	109	59,60%	67	51,15%
men	74	40,40%	64	48,85%

Table 2. List of Polish and Czech respondents by age

age	PL		CZ	
18-24	5	2,60%	40	29,85%
25-34	16	8,40%	18	13,43%
35-44	37	19,50%	17	12,69%
45-54	64	33,70%	26	19,40%
55-64	44	23,20%	1	11,94%
over 64	24	12,60%	17	12,69%

Table 2 shows the age structure of respondents. The age range in Poland differs from that in Czech in that about 30% of the respondents on the Czech side are people in the lowest age group, and on the Polish side people in the 45-64 age range, which could have influenced the results of the survey. It may also be related to the fact that the research region on the Czech side is closely related to the university in Liberec and therefore has a large number of students. On the Czech side, 26.47% of students took part in the study, and only 1% on the Polish side.

c) List of residents by education

The distribution of respondents in relation to education is similar. The existing differences do not affect the interpretation of the test results.

Table 3. List of respondents on the Polish and Czech side by education

Education	PL		CZ	
Primary	9	4,70%	3	2,26%
Technical	47	24,40%	25	18,80%
College	93	48,20%	84	63,16%
Higher	44	22,80%	21	15,79%

d) Social status on the labor market

Table 4. List of Polish and Czech respondents by social status on the labor market

Social status	PL		CZ	
pupil/student	2	1,00%	36	26,47%
Casual labor without contract	1	0,50%	2	1,47%
Contracted employee	121	62,70%	56	41,18%
Self-employed	13	6,70%	8	5,88%
Farmer	1	0,50%	5	3,68%
Retired/pensioner	43	22,30%	18	13,24%
Unemployed	3	1,60%	0	0%
freelancer	9	4,70%	11	8,09%

The most frequently indicated social status on the labor market on both sides of the border was the status - Contract employee - 41.2% (CZ) and 62.7% (PL).

f) Professional relationship of the respondent or his immediate family member with the Turów mine / power plant.

Table 5. Information on the professional ties of the respondents or their immediate family with the Turów mine / power plant on the Polish and Czech sides of the border

Linking the respondent with the Turów mine	PL		CZ	
	No	65	34,80%	133
Yes	122	65,20%	2	1,48%

Among the respondents, 65.2% of those surveyed on the Polish side confirmed that they or their families are professionally connected with the Turów Mine. In the case of the Czech side, it was only 1.5% of the respondents.

### 3.2. Interreg program beneficiaries record for H2 verification

Table 5. List of respondents on the Polish side by type of entity represented

Institution	PL		CZ	
	local government unit	17	48,60%	13
subordinate unit of the local government	10	28,60%	7	18,90%
State institution	0	0%	1	3%
non-governmental organization	8	22,90%	14	37,80%
school or university	0	0%	2	5%

The most numerous group of respondents on the Czech sides were people representing local government units - 35.1%, while the least numerous were those who worked in state institutions - 3%. On the Polish side, the representatives of LGUs also constituted the most numerous group of respondents - 48.60%. None of the people taking part in the study represented a state institution, school or university.

a) Table 6 presents the list of respondents in terms of the key area of activity.

Table 6. List of respondents on the Polish and Czech sides by key area of activity

Activity	PL		CZ	
	matters subordinate to local government units	9	25,70%	10
Education	2	5,70%	8	21,62%
culture and entertainment	9	25,70%	0	0,00%
sport and tourism	2	5,70%	5	13,51%
social affairs	2	5,70%	2	5,40%
regional and local development	10	28,60%	11	29,73%
security and crisis management	1	2,90%	1	2,71%

The key area of activity indicated by the highest percentage of respondents on the Czech side was regional and local development - 29.7%. On the Polish side, the greatest number of respondents gave the same answer - 28.6%.

b) Table 7 shows the period of involvement in the cross-border cooperation of Interreg beneficiaries

Table 7. List of respondents on the Polish and Czech sides by the period of involvement in cross-border cooperation

Engagement period	PL		CZ	
	Up too 5 years	2	5,70%	4
between 5 lat, a nd10 years	14	40%	8	21,6%
10 years and above	19	54,30%	25	67,60%

The majority of beneficiaries on the Czech side declared an involvement in cross-border cooperation for a period of 10 years and above - 67.6%. The same situation occurred on the Polish side.

c) Table 8 presents the total number of partners with which the entity cooperated.

Table 8. List of respondents on the Polish and Czech sides by total number of partners of cross-border projects with which the entity cooperated

Number of partners	PL		CZ	
1	0	0%	7	18,9%
2 to 5 partners	20	57,10%	23	62,20%
more than 5 partners	15	42,90%	7	18,90%

The most common answer given by beneficiaries on the Czech side was having 2 to 5 partners for the cross-border projects with which they cooperated - 62.20%. The same number of partners was indicated by the beneficiaries on the Polish side - 57.10%.

#### 4. Basic characteristics of the area

The Turów lignite surface mine is in the Zittau Basin, in Southwestern Poland (Lower Silesian Voivodeship) near the Germany (Saxony) and the Czech (the Liberec Region) borders. The region is defined by the towns Zittau, Hrádek nad Nisou and Bogatynia as well as the Neisse River and is a part of the Neisse – Nisa – Nysa Euroregion. Our article analyses the Czech and Polish parts of the region, epitomized by peripheries or semi peripheries with complicated modern histories. The most problematic regions in terms of development are territorial protrusions such as the Bogatynia protrusion in Poland or the Czech Frýdlant protrusion. The territory between Zittau and Liberec is a semi periphery with good transport connections (VON KORFF & MAIER et al., 2020).

Bogatynia is remote from important regional and subregional capitals, apart from Liberec, just 16 km away. Public transport is limited and there is no passenger railway, unlike over the border. Public transport links to Zittau, Hrádek nad Nisou or Frýdlant are insufficient. There is a strong border effect on the Czech-Polish border in the area studied, possibly caused by the poor transport links or the peripherality of Bogatynia and neighboring Frýdlant protrusion (DRÁPELA & BAŠTA, 2018). Bogatynia is, however, one of the wealthiest municipalities in Poland. The Turów mine, together with the power plant, provides 7 % of Poland's energy (IZIDORCZYK, 2022). Bogatynia is wealthy but isolated and damaged by mining and industry. There are no effective economic transition programs for Bogatynia and the municipality remains dependent on mining and heavy industry.

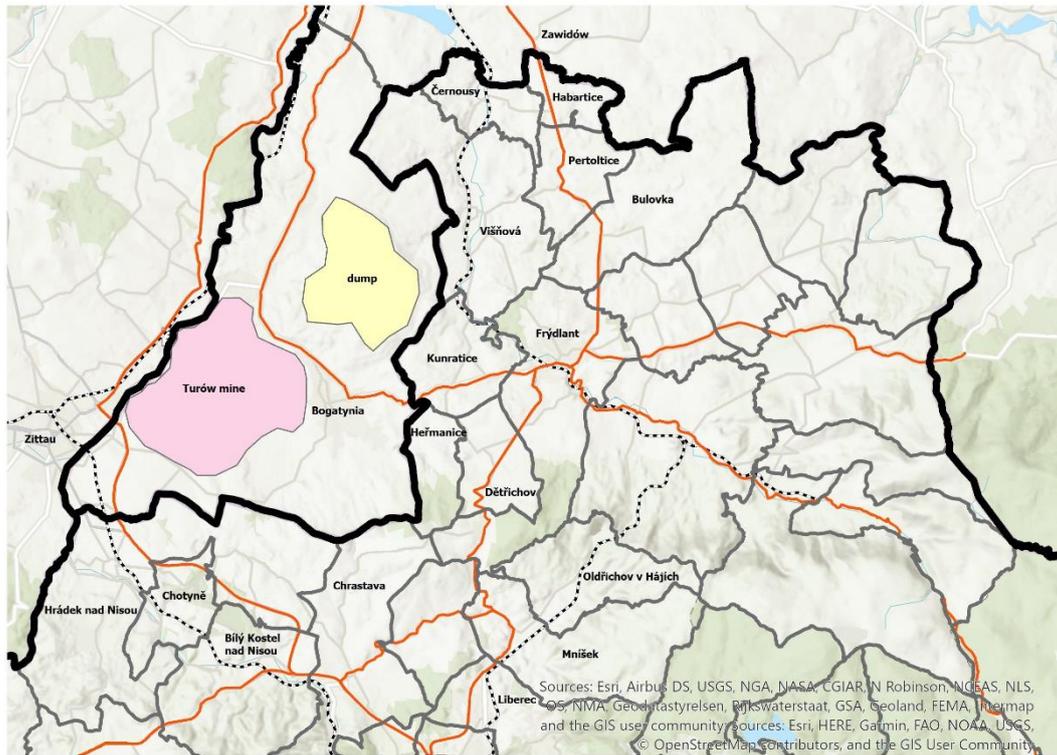
Our text deals with the town and municipality of Bogatynia (21 891 inhabitants, 136,2 km<sup>2</sup>) on the Polish side, where the Turów mine (26 km<sup>2</sup>) is located, and the Czech municipalities affected by the operation of the mine, according to the Liberec Regional Government: Hrádek nad Nisou including the famous border settlements Uhelná and Václavice, Frýdlant, Chrastava, Bílý Kostel nad Nisou, Bulovka, Černousy, Dětrichov, Habartice, Heřmanice, Chotyně, Kunratice, Mníšek, Oldřichov v Hájích, Pertoltice and Višňová (in total 30 439 inhabitants, 297,13 km<sup>2</sup>). The population density is significantly higher on the Polish side of the border thanks to increased urbanization in Bogatynia.

The area impacted by the Turów Mine was determined as a result of a study carried out under the Project. It is relatively small and only affects the municipalities around Bogatynia, including Czech municipalities as indicated in Fig. 1. The problem of asymmetry involves, among others, differences in the administrative division of the border regions, their population density, the level of socioeconomic development, leanings related to cross-border flows, hydrological problems and the proximity of large competitive development centres, including Liberec, as shown in Fig. 2. This asymmetry in the area studied also reflects the different economic character of the municipalities.

#### 5. Empirical analyses and their results

With respect to H1, the following conclusions were drawn:

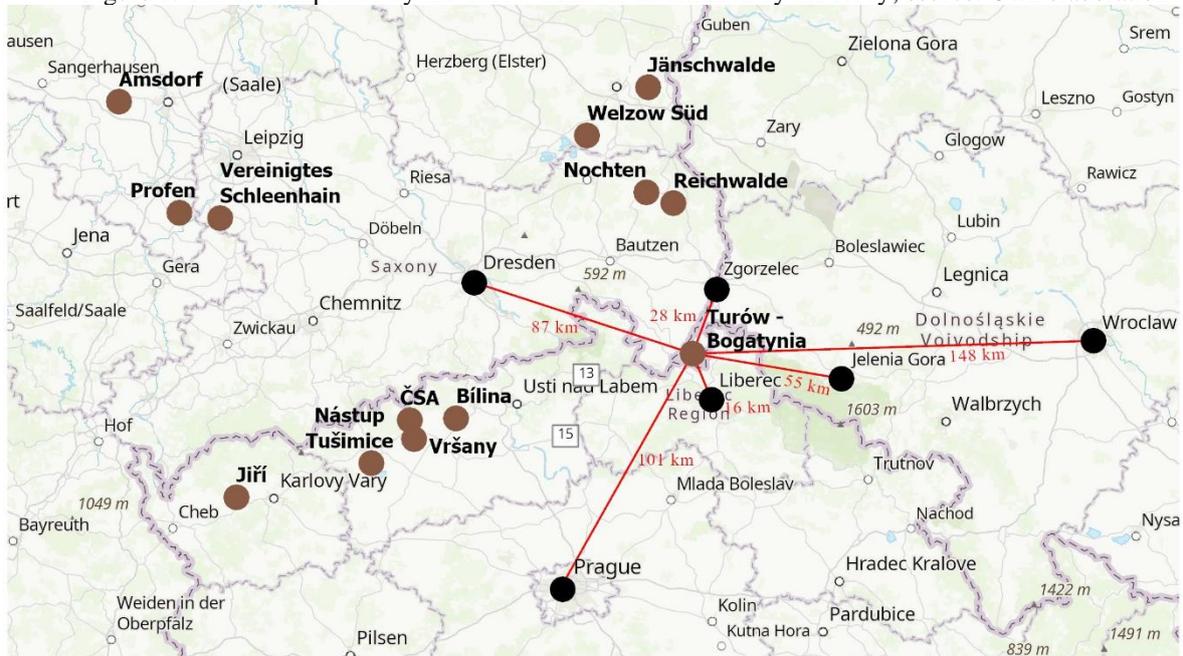
1. The questionnaires indicate diverse preferences and needs with regard to cross-border contacts and the benefits of a cross-border location. They also indicate that the residents' interest in seeking benefits is relatively low, which is caused by factors related to the absence of infrastructure, in the form of roads, the knowledge of a foreign language and the absence of sufficient knowledge and information about existing opportunities. Generally, the level of cross-border contacts is low and there is asymmetry in the reasons for crossing the border: for Czechs it is shopping, while for Poles it is work, culture and sports/tourism. Czechs generally like shopping in Poland because of better prices. Polish preferences show that there are interesting job opportunities over the border – there is even a bus connection between Bogatynia and Liberec operating 3 times a day



- state border
- municipal border
- regional road
- ..... passenger railway

0 10 20 Km

Figure 1. The area impacted by the Turów Mine as determined by the study, source: Own elaboration



- brown coal mine
- city of interest

0 50 100 Km

Figure 2 The links between Bogatynia and the neighbouring regions and the lignite centres in the vicinity, source: Own elaboration

Table 9. Purpose and frequency of Polish-Czech border crossings by respondents from the Polish and Czech sides

Purpose	Very often				Often				Rarely				Very rarely				I don't cross the Polish-Czech border for these purposes			
	PL		CZ		PL		CZ		PL		CZ		PL		CZ		PL		CZ	
Family / friends	7	3,80%	0	0%	20	10,87%	9	7,63%	21	11,41%	9	7,63%	14	7,62%	7	5,93%	122	66,30%	93	78,81%
Work	13	7,07%	0	0%	2	1,09%	4	3,51%	2	1,09%	11	9,65%	3	1,63%	4	3,51%	164	89,13%	95	83,33%
business	2	1,10%	1	0,88%	2	1,10%	6	5,32%	4	2,20%	1	0,88%	11	6,04%	8	7,08%	163	89,56%	97	85,84%
shop-ping	2	1,10%	4	3,28%	12	6,52%	30	24,59%	30	16,30%	35	28,69%	41	26,63%	33	27,05%	91	49,45%	20	16,39%
Educa-tion	0	0%	0	0%	4	2,18%	2	1,73%	5	2,73%	6	5,17%	3	1,64%	15	12,93%	171	93,45%	93	80,17%
Health services	0	0%	0	0%	2	1,10%	0	0%	7	3,82%	1	0,89%	15	8,20%	7	6,25%	159	86,88%	104	92,86%
Culture / enterta-inment	6	3,25%	1	0,90%	16	8,70%	2	1,80%	22	11,95%	10	9,01%	46	25%	30	27,03%	94	51,10%	68	61,26%
Sport/to-urism	16	8,64%	0	0%	28	15,14%	8	7,02%	38	20,54%	25	21,93%	48	25,95%	36	31,58%	55	29,73%	45	39,47%
Travel	20	10,58%	10	8,62%	27	14,29%	10	8,62%	50	26,45%	23	19,83%	43	22,75%	31	26,72%	49	25,93%	42	36,21%

when shifts start and end. Perhaps, there is a lack of job opportunities in Bogatynia except for the Turów Mine or Power Plant. The interest in tourism in Czech results from the damage to the Polish landscape by industry. On the Czech side there are natural reserves such as the Jizera Mountains. Polish businesses concentrated along Motorway A4 (hotels, catering sites, fuel discount stations, currency exchanges and carwashes) also benefit from the cross-border location.

Most residents on the Czech side crossed the border infrequently (see Table 9) with 80.1% of respondents declaring that they do not cross the border for education, 85.8% for business and 92.8% for the Polish health service. 61.2% of respondents do not cross the border to take advantage of the cultural and entertainment offer and a further 36% cross the border for this reason rarely or very rarely. The interest in sports and tourism offers is also low: 39.4 % do not cross the Polish border for this purpose, and more than half rarely or very rarely (21.9% and 31.5% respectively).

The most common reason for crossing the border is shopping - 27.9% used this option very often or often, followed by travel (transit) - 63.7% of Czechs (very often - 8.6%, often - 8.6%, rarely - 19.8%, very rarely - 26.7%). The third reason is sport / tourism - 60.5%, and culture and entertainment (38.7%, most of whom only very rarely - 31.6%).

- The questionnaires also show that asymmetry is manifested by diverse regional specialisations. On the Polish side, there is the energy industry, whereas on the Czech side there is an automotive cluster. For Polish respondents, aspects related to employment and a stable municipal financial situation are very important. This shows that the Turów energy complex is a very important employer in the region.
- The surveys also reveal asymmetry in the scope of nature and landscape which affect the settlement system. The system was formed over many years. It is asymmetric and this has an adverse effect on the character of integration of these regions. Residents appreciate natural and architectural values but the absence of sufficiently developed technical infrastructure and lack of access of Polish municipalities to railway connections has had an adverse impact. These deficiencies occur not only on the Polish side. The lack of investment on the Czech side is painful, too. The environmental and economic landscape developed in this way does not lay the foundations for cross-border cooperation.
- The surveys which were carried out also confirm the hypothesis that cross-border asymmetry perceived by residents is also manifested in the negative development factors; low prospects for university education on the Polish side, a lack of well-paid job opportunities, little in the way of attractive culture and recreation, infrastructural deficiencies, no communication of actions for sustainable development, etc.

In conclusion, it can be said the crisis at the Turów Mine generated publicity for the region but did not affect the cross-border integration processes. Cross-border asymmetry, which is aggravated by the absence of infrastructure and cross-border transport, is a factor which weakens integration.

With respect to H2, institutions (the beneficiaries of the Interreg funding, local governments and nongovernmental organisations, the Neisse-Nisa-Nysa Euroregion, EGTC etc.) were investigated. Particular attention was paid to the impact of the crisis on the use of the Interreg Programme. The research question which we posed was whether the dispute Mine had disturbed the internal homeostasis and affected the cooperation between institutions in the Polish-Czech borderland.

An evaluation of the competitiveness of the Municipality of Bogatynia in the context of the contemporary directions of sustainable development indicates that the local competitiveness is gradually being eroded. Strategic actions for diversification and energy transition of the region require long-term investment and support. Regional and local actors, directly participating in the process of anticipating and responding to crises, play an important role in this process. Primarily actions of a collective character play a key role. It was particularly this aspect that was investigated among the beneficiaries of the Interreg Programme. The decisive factors in a crisis include the mobilisation of social resources and strong actions in communication and a common narrative of many important local and regional actors. In this approach, the institutional potential is regarded as a critical factor for the organisation of relations and the initiation of interactions among actors (Harris et al., 2020) and in the case of Bogatynia it plays an vital role.

In accordance with the concept adopted for the study, the research presented here had mainly a qualitative character and it was in this context that the problem of resilience was examined. It was assumed that in Bogatynia and the neighbouring municipalities, including those on the Czech side, new elements of local activity and intentions of actors appeared and that they could have a positive effect on the outcome of the transition of the region to a more sustainable direction, primarily in environmental terms (Bristow & Healy, 2015). Research reveals such remedial tendencies related to a high level of Bogatynia local government and PGE Management Board activity, which will communicate the Czech side more about their actions for sustainable development. Two completely different contexts should also be emphasized: one pre-energy crisis and the other post the outbreak of the war in. Research shows that institutions like the Euroregion, implement Interreg projects, which are not always carried out symmetrically on the Polish and Czech sides.

The positive verification of the second research hypothesis adopted here can be evidenced by the following conclusions from the research:

1. Cross-border asymmetry is visible in the context of local needs and is also visible in the context of the declared needs and directions of action for the regional development of the regions studied. The interest in the implementation of Polish-Czech micro-projects is higher on the Czech than on the Polish side. Nearly 41 % of Czech respondents expressed an interest in the implementation of micro-projects, on the Polish side - 25.7 percent. Almost every third respondent in the Czech Republic (29.7%) did not express their interest on behalf of their entity, while in Poland - 20%. More respondents on the Polish side chose the answer *I don't know* (54.3%) than on the Czech side (29.7%). The Czechs showed interest in micro-projects related to environmental protection, land revitalization and reclamation, sustainable use of transport resources, education and school cooperation. Beneficiaries on the Polish side were most interested in the implementation in ecology, tourism, crisis management and institutional cooperation projects.

Table 10. List of beneficiaries' responses on the Polish and Czech side regarding new areas of cross-border cooperation that should be developed

New areas for development in projects	PL		CZ	
	Environmental Protection	3	100,00%	11
Energy transformation	3	100,00%	8	66,70%
Improving the landscape	3	100,00%	9	75,00%
Rebuilding mutual trust in social relations	2	66,70%	4	33,30%
Crisis management	1	33,30%	3	25,00%
Cross-border communication (transport)	0	0,00%	2	16,70%

2. Most beneficiaries on both sides of the border believed the dispute over the Turów Mine had not translated into the development of new areas in the Polish-Czech cross-border cooperation. Nevertheless, the percentage of persons who gave such an answer was much lower on the Czech than the Polish side (43.2% and 62.9%, respectively).
3. The overwhelming majority of beneficiaries on the Czech side believed crisis resilient cross-border cooperation to be characterised by good interpersonal relations in the teams carrying out cross-border projects (75.7%, por. Tab. 11). In turn, the Polish beneficiaries focused on the interpersonal relations in the teams carrying out cross-border projects, a high level of mutual trust, making sure that the cooperation is based on equal benefits and a mutual understanding of the partners' needs and problems (48.6%, 42.9%, 40% and 40% respectively).

Table 11. List of beneficiaries' responses on the Polish and Czech sides regarding the characteristics of cross-border cooperation resistant to crises such as the dispute over the Turów Mine

	PL		CZ	
Good interpersonal relations in teams implementing cross-border projects	17	48,60%	28	75,70%
A high level of mutual trust	15	42,90%	8	21,60%
Basing cooperation on equal benefits for both parties	14	40%	15	40,50%
Durability of alliances between partners of cross-border cooperation	7	20%	2	5,40%
A common interest in the willingness to raise funds from the INTERREG program	6	17,10%	4	10,80%
A professional approach to cross-border cooperation (knowledge and know how)	10	28,60%	7	18,90%
Experience in cross-border cooperation	4	11,40%	3	8,10%
Using own funds to maintain cooperation also outside of projects co-financed from the INTERREG program	5	14,30%	0	2,70%
Mutual understanding for the needs and problems of partners	14	40%	21	56,80%
Assigning tasks related to cross-border cooperation to specific employees	0	0%	1	2,70%
Including cross-border cooperation in the organization's operational strategy	4	11,40%	0	0,00%
Common values shared by partners	4	11,40%	12	32,40%

Table 12. Cross-border asymmetry in the context of the verification of the hypotheses, source: Own elaboration

Manifestations of asymmetry in the context of the verification of hypothesis H1	Manifestations of asymmetry in the context of the verification of hypothesis H2
Imbalance between the inhabitants of border communes in terms of meeting their educational, business and tourist needs	Different specialization on both sides of the border
The country's stronger leanings towards internal national matters than cross-border ties	Functional proximity in ineffective sectors of the economy
High public approval of the integration processes and low approval of cooperation	Continuous transformation of institutional structures related to the border region
Low infrastructure availability (railways, roads, bicycle paths, waterworks)	Low public approval of cross-border institutions
Sustainable development which does not take into account the cross-border scale	Institutional gap
Sustainable development not taking into account the cross-border scale (no links integrating various areas of economic activity)	A different administrative and competence division, hampering cross-border cooperation
Difference in economic development	Low populations of Czech municipalities as partners for cooperation with Polish municipalities
Underdeveloped municipal infrastructure	Asymmetric support from the nation states
The absence of a strong representation of economic operators at local level	The absence of international agreements and memorandums of understanding on cooperation
Weaknesses of the public; poor knowledge of foreign languages and negative stereotypes	The need for the energy transition on the Polish side
Residents' low involvement in cross-border projects	A complicated procedure for mobilising resources for cross-border cooperation and the ways of accounting for assistance resources
Differences in residents' quality of life	
Differences in spatial development	Low activity of offices in navigating cooperation
	Poorly developed cross-border communication in mitigating environmental problems
	Poor coordination between institutions in the scope of cooperation
	The absence of marketing measures and CSR in the scope of the environmentally harmful operations of large enterprises
	No actions to prevent the emergence of crisis situations

## Conclusion

The research confirmed the validity of the hypotheses posed. The conclusions confirm that the elimination of development asymmetries or their recognition as valuable for development in certain areas of the economy is a very important factor in the processes of cross-border integration and cooperation. Table 12 shows the manifestations of asymmetry which the Authors consider to be the most important in the context of the verification of the research hypotheses.

It is difficult at this point to enumerate the eventualities which may arise in the future. Although not all potential problems are equally, dangerous, they should all be borne in mind and addressed, (Gorynia & Trąpczyński, 2022). Such problems include economic policy. In turn, disparities of a cross-border character, especially in the social, climatic and demographic areas can be treated as longer-term problems.

It is possible and necessary to ask to what extent the proximity of the power plant ensures a safe and just development space? It is difficult to answer, as the unstable geopolitical situation contributes to the emergence of factors which can affect the approach of the evaluation. At present, humankind not only exceeds critical biophysical limits but also fails to achieve the minimal social thresholds guaranteeing a “safe and just” development space (O’Neill et al., 2018).

It follows that greater sustainability can be achieved as a result of the transition of the border regions in many areas: economic, technological, information and institutional. Asymmetry should be gradually alleviated by immersing the regions into the digital economy, thus contributing to their resilience (Łaźniewska, 2022). Each innovation must be accompanied by an exact assessment of its impacts; still, they can be important tools for remaining in a safe and just space for mankind.

The need for communication and marketing actions of a cross-border character can also be associated with the need for innovation as a means of conflict resolution. There must be cross-border interaction between regional and local actors who have diverse knowledge and resources and in this context, asymmetry is a positive factor.

The border regions are a very interesting testing ground for different types of international relations. The resilience of the regions to different types of internal disturbances is strongly related to the involvement of different actors in cross-border relations and in the building of the image of their own actions in a wider area with a cross-border dimension. It is very important for local actors to communicate their remedial measures so, as to win residents’ support and ease local tensions.

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