

# Increasing Local Community Resilience in the EU-Ukraine Cross-Border Area<sup>1</sup>

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## Abstract

Nowadays, the development of local communities is hindered by crises, external shocks, and disturbance. Under such circumstances, an important characteristic is their resilience, i.e. the ability to withstand negative external influences and ensure further growth. Border communities are particularly sensitive to external stresses stemming from geopolitical and economic changes. The article aims to identify key determinants and indicators of territorial community resilience in the EU-Ukraine cross-border area. The methodological foundations of the research comprise the main provision of economic theory, regional development, and spatial economy theory, etc. The methods of comparative, economic, and statistical analysis are used in the study of various dimensions of community resilience. The main results of the study of the peculiarities of socioeconomic development of Ukraine's border communities and existing opportunities for the use of instruments of cross-border cooperation derive from a sociological survey based on the expert opinion method.

## Keywords

territorial community, resilience, cross-border cooperation, EU-Ukraine cross-border area

## Introduction

The local communities in Ukraine are currently facing substantial changes in terms of their fundamental operation and development due to decentralisation and administrative-territorial reforms. These started in 2014 as the drivers of positive changes brought by expanded jurisdiction, including financial, transferred to the local level. However, in addition to the obvious advantages of decentralisation, some communities face a range of risks, including the use of local budgets for

<sup>1</sup> The presented study is part of the work carried out under the project NAWA entitled *Challenges for the labour market in counties in the Polish-Ukrainian borderland with regard to the influx of war refugees from Ukraine. Assessment of the situation, conclusions for Polish regions, entrepreneurs, and county labour offices.*

purposes other than intended; the emergence of substantial imbalances between the delegated new responsibilities and available financial resources of a community; growing unequal development of territories within a community and the country; declining accessibility and quality of educational and medical services; falling quality of local governance; reduced impact of the state on the management of local development processes; further economic recession of the communities' territories, etc.

These risks can become even more threatening for the border communities due to their distance from the central regions of the country, which are currently the areas where investment and economic activity is concentrated. Lacking job opportunities and relatively low economic development create the conditions for an illegal economic sector to flourish. Border regions are still donors of cheap workforce and providers of raw materials for partners from neighbouring countries.

However, the proximity of the communities along the Western border of Ukraine to the EU brings them a range of opportunities to be enjoyed. The liberalisation of foreign economic activity due to the EU-Ukraine Association Agreement effective since 1<sup>st</sup> September, 2017, visa-free transit between the EU and Ukraine, etc. are and will continue to have significant influence on the socio-economic development of regions, especially those along the Western border of the country (the Volynska, Lvivska, Zakarpatska, Ivano-Frankivska, and Chernivetska oblasts) – one of the EU's external borders. The communities of these regions together with the adjoining communities of neighbouring countries (Poland, Slovakia, Hungary, and Romania) can also enjoy the instruments of cross-border cooperation commonly used in the EU, including participation in the cross-border cooperation such as EGTCs, Euroregions, cross-border clusters or cross-border industrial parks, joint CBC projects, joint promotion of cross-border regions, as well as various joint educational, cultural, and sports initiatives. Yet, for now, these instruments are insufficiently used by Ukrainian communities. Moreover, some of the latter are not even aware of many ways provided by the EU approach to cross-border cooperation to solve the problems shared by adjoining regions.

In addition to the above-mentioned current development challenges and risks that the territorial communities face, in their early years as basic administrative-territorial units, they developed and continued to do so even during the COVID-19 pandemic (starting since 2020) and the introduction of martial law in Ukraine (since 24<sup>th</sup> February, 2022, due to military aggression from the Russian Federation). These challenges were powerful shocks to the development of local communities both in Ukraine and globally. In these circumstances, resilience (resistance) will play an essential role in securing the development of territorial systems of various levels. Therefore, the analysis of the main determinants and indicators of border community resilience in existing challenges is quite relevant as it gives grounds to suggest cross-border cooperation instruments to boost their resilience in the future.

## **1. Literature review**

### **1.1. The development of the resilience concept in scientific literature**

Various interpretations of resilience in the scientific literature have been examined by Martin and Sunley (2015), including engineering resilience showing how quickly the system can return to an equilibrium having been disturbed by shock or crises, ecological resilience as the ability of the system to absorb disturbance and reorganise, and adaptive resilience as an adaptation to shocks and the maintenance of structural and operational activity. Joshua E. Cinner and Michele L. Barnes (2019) highlight the key social factors that provide resilience in linked social-ecological systems, including assets, flexibility, social organisation, learning, socio-cognitive constructs, and agency. Wink (2013) addresses the concept and the policies to strengthen regional economic resilience focusing on short-term reactions (instruments of fiscal policy such as short-term allowances, additional public infrastructure investments, reduced taxes, etc.), mid-term measures to strengthen adjusting capabilities after shocks (reforms to increase labour mobility or public investments to strengthen emerging technologies and new market infrastructures), and mid-term preventive activities to anticipate external shocks and develop strategies to reduce vulnerability or increase adjusting capabilities (broader measures to support local civic engagement, diversifying processes in

leading economic sectors). Regional economic resilience is also the subject of a study conducted by James Simmie and Ron Martin (2010). They compare how regions reacted to recessions by analysing employment and new businesses.

A significant number of studies address local and community resilience. The approaches to the interpretation of community resilience are systematised by Sonny S. Patel, M. Brooke Rogers, Richard Amlôt, and G. James Rubin (2017). Based on this analysis, the authors identify several elements of community resilience, including local knowledge, community networks and relationships, communication, health, governance and leadership, resources, economic investment, preparedness, and mental outlook. Ayyoob Sharifi (2016) provides a critical review of the tools to assess community resilience and categorises them as “formative” or “summative”. Summative tools are mainly outcome-based and formative tools take into account the significance of the assessment process. They also categorise resilience criteria into five key dimensions – namely, environmental, social, economic, infrastructure and built environment, and institutional. Deborah Platts-Fowler and David Robinson (2016) determine three community resilience pillars: the circumstances and situations of the population (individual resources, age profile, capacity to engage, population stability, diversity and difference), the local context or setting, including resources, services, amenities, and facilities (physical environment, facilities and amenities, service provision, active citizenship, media and communications, links to power and influence, housing, crime and anti-social behaviour), and the sense of community (shared notions of belonging and identity, inclusive communities).

Many domestic and foreign scientists examine various aspects of cooperation between neighbouring communities across sections of the Ukrainian border. Border trade peculiarities are among the most researched – for example, Cassidy (2014) examines cross-border small trading and gender-related aspects in Ukrainian-Romanian cross-border regions. Bar-Kořelis and Dopierała (2014) outline the cross-border shopping peculiarities in Ukrainian-Romanian and Ukrainian-Polish cross-border regions, while Lačný (2017) explores the Slovak-Ukrainian economic interaction with regard to the respective CBC area. Problems and perspective directions of CBC development between Ukraine and Hungary are determined by Kish (2018). Varnaliy Z. and Vasylytsiv T. (2016) analyse the obstacles facing CBC development in Ukrainian border regions, based on the results of sociological and expert research. However, sociological surveys of representatives of local communities directly involved in cross-border cooperation are very rare in Ukraine; therefore, the one presented in this paper is of particular importance for understanding the most recent state of affairs in this domain.

Ways to increase the Ukrainian border regions' competitiveness through cross-border clusters, cross-border industrial zones, and European groupings of territorial cooperation are examined by Sotnikov and Kravchenko (2013). Borshch (2014) outlines the theoretical aspects of cross-border cooperation and assesses its impact on the economic growth of border communities in western Ukraine. New forms of cross-border cooperation are studied by Zarichna (2018). Recently, domestic researchers have started addressing the impact of decentralisation on cross-border cooperation. For example, Bakushevych, I., Goshchynska, D., and Martyniak, I. (2019) consider how decentralisation and innovative entrepreneurial ecosystems change EU-Ukraine cross-border cooperation.

## **1.2. EU strategies and programmes for building resilience**

The issue of resilience is currently present almost in every strategic and programme document of the European Union. Namely, the 2019–2024 Strategic Agenda addresses resilience in 2 out of 4 priorities – protecting citizens and freedoms (in the context of “fighting terrorism and cross-border/online crime, increasing the EU's resilience against both natural and man-made disasters”) and developing a strong and vibrant economic base (in the context of “building a resilient economy by deepening the Economic and Monetary Union to ensure that Europe is better prepared for future shocks, completing the banking and capital markets union, strengthening the international role of the euro, investing in skills and education, supporting Europe's businesses, embracing digital transformation, and developing a robust industrial policy”) (European Union, 2022).

The Recovery and Resilience Facility is the instrument under the NextGenerationEU initiative that aims to “mitigate the economic and social impact of the coronavirus pandemic and make

European economies and societies more sustainable, resilient and better prepared for the challenges and opportunities of the green and digital transitions” (European Commission, 2022). On 12<sup>th</sup> June, 2020, the Cabinet of Ministers of Ukraine issued 24 orders to identify administrative centres and approve the territories of communities in the oblasts. According to the instrument, national recovery and resilience plans must be submitted to the European Commission (European Union, 2022).

Article 3 of the Regulation (EU) 2021/947 of the European Parliament and of the Council of 9<sup>th</sup> June, 2021, establishing the Neighbourhood, Development and International Cooperation Instrument – Global Europe, amending and repealing Decision No 466/2014/EU and repealing Regulation (EU) 2017/1601 and Council Regulation (EC, Euratom) No 480/2009 (new EU financial instrument for 2021–2027) outlines the objectives of the instrument, including among general objectives: 1. c) promote stronger partnerships with third countries, including with the European Neighbourhood Policy countries based on mutual interests and ownership with a view to fostering stabilisation, good governance and building resilience; and among specific objectives: 2. d) to respond rapidly to: ii) resilience challenges, including natural and man-made disasters, and linking of humanitarian aid and development action. Article 31 addressing the scope and financing of EFSD+, the External Action Guarantee, budgetary guarantees and financial assistance to third countries provides that the EFSD+ shall “promote socio-economic and environmental resilience in partner countries with a particular focus on the eradication of poverty” (EUR-Lex, 2021).

Neighbourhood, Development and International Cooperation Instrument – Global Europe allocates 3.182 billion EUR for a rapid response mechanism “that will allow the EU to swiftly respond to crises, contribute to peace, stability and conflict prevention, strengthen the resilience of states, societies, communities and individuals, linking humanitarian aid and development action” (European Commission, 2021).

A joint paper on Interreg NEXT Strategic Programming 2021–2027 that includes 3 CBC programmes covering Ukraine provides the measures to be taken to achieve the policy objectives, namely (Cross-border Cooperation Programme Poland-Belarus-Ukraine 2014–2020, 2021):

- Policy objective 2 “A greener low-carbon Europe and its neighbourhood” should be achieved through the promotion of “energy efficiency, clean renewable energy, climate change adaptation, risk prevention and disaster resilience, sustainable water management and the transition towards a circular economy in both the Union and the partner countries”;
- Policy objective 3 “A more connected Europe with its neighbourhood” should be achieved through the enhancement of digital connectivity for “the development of sustainable, climate resilient, intelligent, secure and intermodal regional and local cross-border mobility”;
- Policy objective 4 “A more social Europe and its neighbourhood” should be achieved through the enhancement of “timely access to quality, sustainable and affordable healthcare services across borders can also be supported, as well as improving accessibility, effectiveness and resilience of healthcare systems and long-term care services across borders”.

In 2021–2027, Ukraine participates in 3 cross-border and 1 transnational cooperation programmes: Black Sea Basin, Hungary-Slovakia-Romania-Ukraine, Romania-Ukraine, Poland-Ukraine. Previously, the programmes had been implemented within the European Neighbourhood Instrument, whereas now they are a part of the Cohesion Policy and Interreg initiative called Interreg NEXT. It is worth mentioning that some of the programmes have extended operation periods until 2029, which may be because the programmes will start operating later than initially planned as the implementation of projects in 2014–2020 programmes was prolonged due to the COVID-19 pandemic. Interreg NEXT cooperation programmes for the period 2021–2027 have been allocated 1.1 billion EUR from the European Regional Development Fund (ERDF), the Neighbourhood, Development and International Cooperation Instrument (NDICI), and the Instrument for Pre-Accession (IPA) (European Commission, 2022).

The programmes mention resilience in the context of promoting climate change adaptation, emergencies prevention (all programmes), the maintenance of equal access to health care and the development of resilient health care systems (excluding the Black Sea Basin), and the improvement of equal access to inclusive and qualitative services in education, training, and life-long

learning through the development of accessible infrastructure, including the promotion of resilience for remote and online education and training (Romania-Ukraine programme).

The issue of resilience is currently in the focus of both scientists and practitioners in developing and implementing a vision of world development for the future. In the face of new challenges and external shocks, resilience becomes an important functional characteristic of the development of countries, regions, and local communities.

## 2. Methodology

The article aims to identify key determinants and indicators of territorial community resilience in the EU-Ukraine cross-border space.

Nowadays, territorial communities (TCs) function as dynamic socioeconomic systems in circumstances of instability, continual change, and crises. Resilience is an essential functional feature of TCs as a complex system. The resilience of a system means its capacity to maintain necessary properties (functional, structural, etc.) under the impact of turbulence. Resilience can be static or dynamic. Static resilience is the ability of a system to come back to the established regime after small regime disruptions that have changed system parameters only slightly compared to their average rates. Dynamic resilience is the ability of a system to come back to the established regime after significant disruptions. In almost every case the functional resilience of the system, including its management system resilience, is dependent on the values of external impact parameters and the impact of some system elements on others that connect the system elements into an integral structure. Systems where resilience depends only on the values of impact parameters are structurally resilient. Yet, there are systems where resilience cannot be achieved only by changing the parameter values of their elements. For that matter, the structure of the system must be changed. These systems are called structurally non-resilient (Roberts, 1976).

The general functions of TCs as systems are outlined in legislation. Their adaptation to real circumstances in the process of functioning is a difficult task. The efficiency of the combination of structural and parametric system components should be determined. Some functional features of TCs that directly impact their functional resilience can be quantified, including efficiency, reliability, management quality, interference protection, complexity, etc. (Plahta et al., 2001; Plahta & Prytula, 2001).

It is important to distinguish between absolute and relative resilience. An absolutely resilient system is incapable of development as it counteracts deviations. It returns to equilibrium under any external or internal impact. Meanwhile, permanent non-resilience is another extremity harmful to the system, the same as hyper resilience. It eliminates the possibility of adaptive consolidation of characteristics useful for survival in a given environment. Therefore, "development through non-resilience" secures resilience at a higher level (Haken, 2009).

The methodological foundations of the research comprise the main provision of economic theory, regional development and production location theory, spatial economy theory, etc. Comparative, economic and statistical analysis was performed.

### 2.1. The analysis of the capacity of border TCs

The analysis is based on the approved methodology for evaluating the capacity of TCs. On 8<sup>th</sup> April, 2015, the Cabinet of Ministers of Ukraine adopted Resolution № 214 On Approving the Methodology of Forming the Capable Territorial Communities, which outlined the major criteria and indicators of the capacity of TCs. Capable territorial communities are defined as "... territorial communities of villages, towns, cities that can independently or through local governments secure the appropriate level of provision of public services as a result of voluntary consolidation (voluntary association with a consolidated territorial community), namely the services in education, culture, healthcare, social security, and housing, considering their human and financial resources and the development of infrastructure of the respective administrative-territorial unit..." (Resolution CMU, 2015). ***This approach to defining the capacity of a TC shows that certain resilience elements***

**were laid down at the stage of TC establishment.** In this case, we can discuss **functional resilience**.

The estimation of the level of TC capacity included:

- consideration of five criteria that characterise the major socioeconomic parameters that impact the development of the respective capable TC: the number of permanent residents in the territory of the capable TC; the number of pupils in general secondary education institutions located in the territory of the capable TC; the area of the capable TC; budget tax capacity index of the capable TC; the share of local taxes and fees in the budget revenues of the capable TC;
- assigning a numerical value to a criterion depending on the value of a parameter of the respective criterion: 0.3; 0.6, or 1;
- estimating the capacity of capable TCs based on the sum of the numerical values of capacity estimation criteria: low capacity – from 1.5 to 2.1; average capacity – from 2.2 to 3.8; high capacity – from 3.9 to 5.

## 2.2. Expert survey of representatives of border communities

In order to shed light on border communities' capacity, threats, and opportunities for development, a survey was conducted based on the expert opinion method. Such research is of especially high value because the statistical data is quite limited when it comes to local communities in Ukraine; only simple aggregated information is available, so a sociological survey is the most reliable way to reveal the current state of development and map future trends.

A sociological survey was conducted in 2019 among Ukrainian communities which share a border with the EU Member States. The survey included employees or mayors (heads) of the local authorities of 124 communities, 60 of which filled out the questionnaires, corresponding to a response rate of about 48.4%. The main problem incurred while disseminating the questionnaire was that not all border communities in Ukraine have Internet access or telecommunication services, especially those in remote mountainous areas. Therefore, the PAPI (Pen-and-Paper Personal Interview) method was used.

The questionnaire consisted of three blocks. The first one asked questions to evaluate the capacity of the border communities' economic development; the second one aimed to reveal the current trends in cross-border cooperation with the participation of border communities; the third one intended to discover perspectives on border community development.

## 2.3. The analysis of the resilience of border communities in 2020 – the first half of 2023

It was carried out on the basis of a study of the impact of COVID-19 on the formation and implementation of local budgets based on the example of 7 border TCs that had been consolidated before 2018 and remained the same (without change in the number of settlements which were amalgamated into a TC). The budget execution allows the community to function and increase the community capacity. Among the indicators of budget execution are local budget revenue per capita, the amount of capital expenditure per capita, budget subsidies.

Given the object, subject, and purpose of the study, we can formulate the following hypotheses of the research:

**Hypothesis 1 – Less economically-developed communities are less resilient.**

**Hypothesis 2 – A location close to the border is a determinant of a community's low socioeconomic development.**

The informational basis of the research includes the accessible statistical data on TCs, the methodology of evaluating the capacity of capable TCs approved by the Government, and the results of a sociological survey conducted by the authors. A limited list of available indicators and short dynamic indicator series were factors that restricted the empirical research.

### 3. Results

#### 3.1. Building local community resilience – the main indicators and determinants

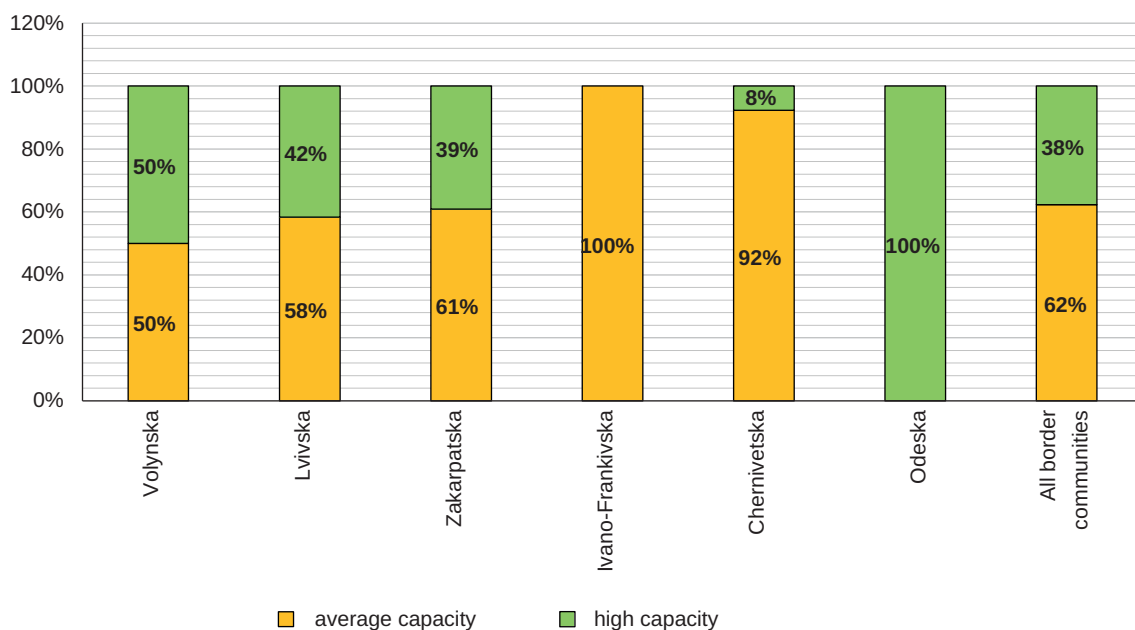
On 12<sup>th</sup> June, 2020, the Cabinet of Ministers of Ukraine issued 24 orders to identify administrative centres and approve the territories of communities in the oblasts (in compliance with long-term plans). As a result, 1,469 territorial communities were established. 61 of the 1,469 TCs are border communities in the Ukraine-EU cross-border space (see Table 1).

**Table 1.** The number of TCs in Ukraine regions bordering EU countries and Moldova

Oblast	Country sharing a common border	Total number of TCs in oblast	Which of them share a border with another country	
			number	% to the total number in oblast
Volynska	Poland, Belarus	54	11 (among them 6 with Poland)	20%
Lvivska	Poland	73	12	16%
Zakarpatska	Poland, Slovakia, Hungary, Romania	64	23	36%
Ivano-Frankivska	Romania	62	2	3%
Chernivetska	Moldova, Romania	52	17 (among them 13 with Romania)	33%
Odeska	Moldova, Romania	91	24 (among them 5 with Romania)	26%

Source: Own elaboration based on the Ministry of Communities and Territories Development (2021).

About a third of all the communities in the Zakarpatska and Chernivetska oblasts are border communities. Border communities in our research have an average capacity level (62%) or high-capacity level (38%) according to an estimation based on data of 2021 (see Figure 1).



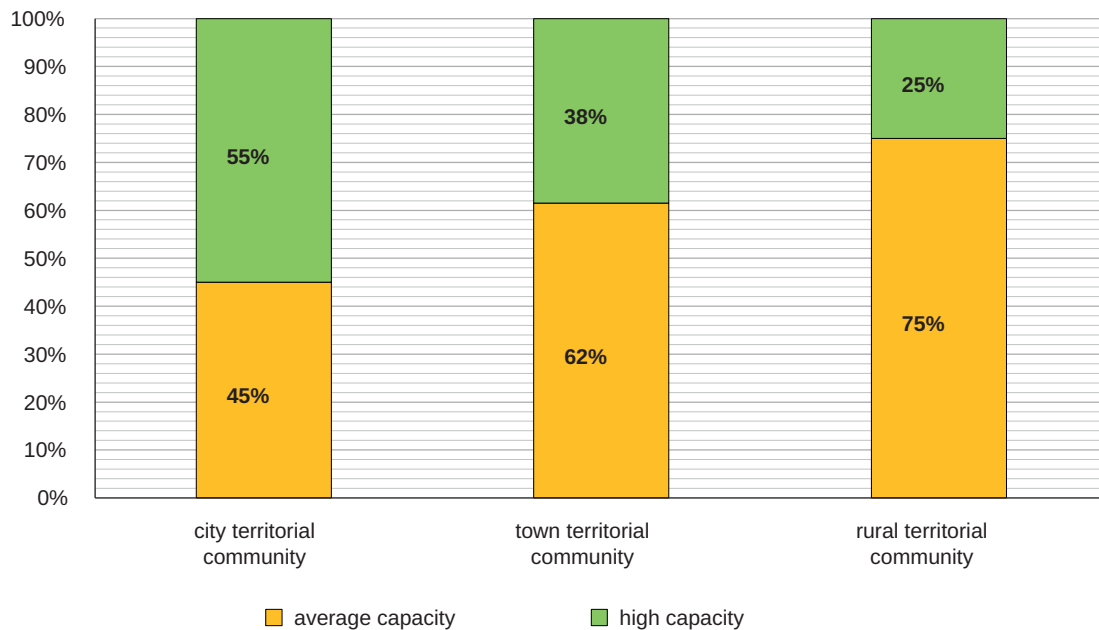
**Figure 1.** The level of border communities' capacity by oblasts in 2021

Source: Own elaboration.

All border communities in the Odeska oblast have a high capacity. Meanwhile, between 39–50% of border communities in the Zakarpatska, Lvivska, and Volynska oblasts are high-capacity. Border communities in the Ivano-Frankivska and Chernivetska oblasts are predominantly of an average capacity.

Such a distribution of border communities according to their capacity level is primarily determined by the local community type: rural, settlement, or urban. Urban TC is a community with the administrative centre in the city, a settlement TC is a community with the administrative centre in the urban-type settlement, and a rural TC is a community with the administrative centre in the village.

Figure 2 presents the distribution of border communities according to their capacity level and types.



**Figure 2.** The level of border communities' capacity by type in 2021

Source: Own elaboration.

The largest share of border communities with a high capacity level is among city TCs. 4 out of 5 border communities in the Odeska oblast are city TCs. 9 out of 12 in the Lvivska oblast are also cities by type. The smallest share of communities with a high-capacity level are among rural TCs. 9 out of 13 border communities in the Chernivetska oblast are rural.

One of the determinants of the socioeconomic development of border communities is the presence of checkpoints within its territory, especially for vehicles and pedestrians. The volume and dynamics of passenger and cargo traffic through checkpoints have an impact on the economic development of border areas. Therefore, at the stage of voluntary consolidation, the configuration of the amalgamation was determined by checkpoint category and type. International automobile checkpoints are located in 13 out of 61 border communities. It is worth noting that both the Yavorivska and Sokalska TCs have three international automobile checkpoints within their territory.

The level of the oblast's economic development has an impact on TCs development as they are an open socioeconomic system. Of the border oblasts, Lvivska and Odeska had the highest level of socioeconomic development with a GRP (Gross Regional Product) per person of 3,684 EUR and 3,563 EUR in 2021, respectively. The lowest GRP per person was in the Zakarpatska and Chernivetska oblasts – 1,876 EUR and 1,890 EUR respectively.

The development of communities and their resilience are also determined by the level of cooperation with border communities of neighbouring countries. Figure 3 shows the ratio of communities according to their capacity level and countries with which they have a common border. The



largest number of communities with a high-capacity level are located on the borders with Poland and Slovakia.

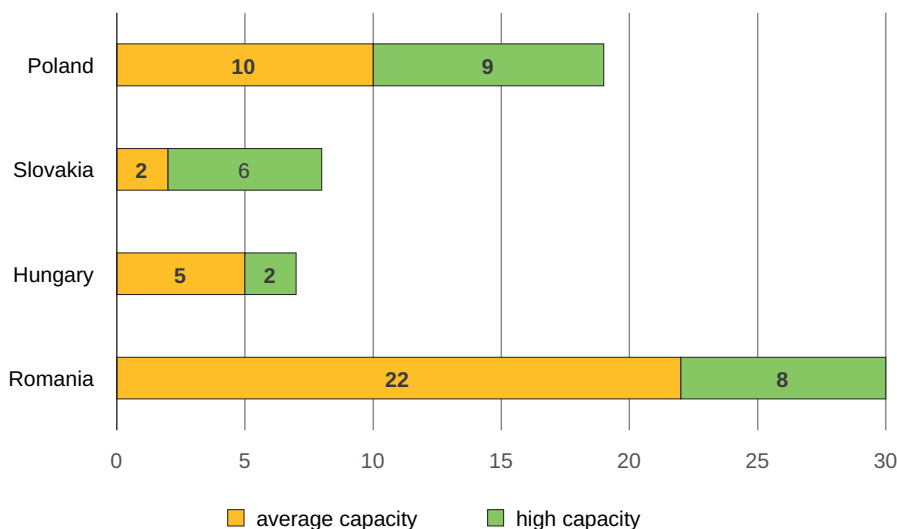


Figure 3. The level of TCS' capacity at the border with EU-countries

Source: Own elaboration.

Figure 4 shows the comparison of average indicators between the border communities and communities in Ukraine generally.

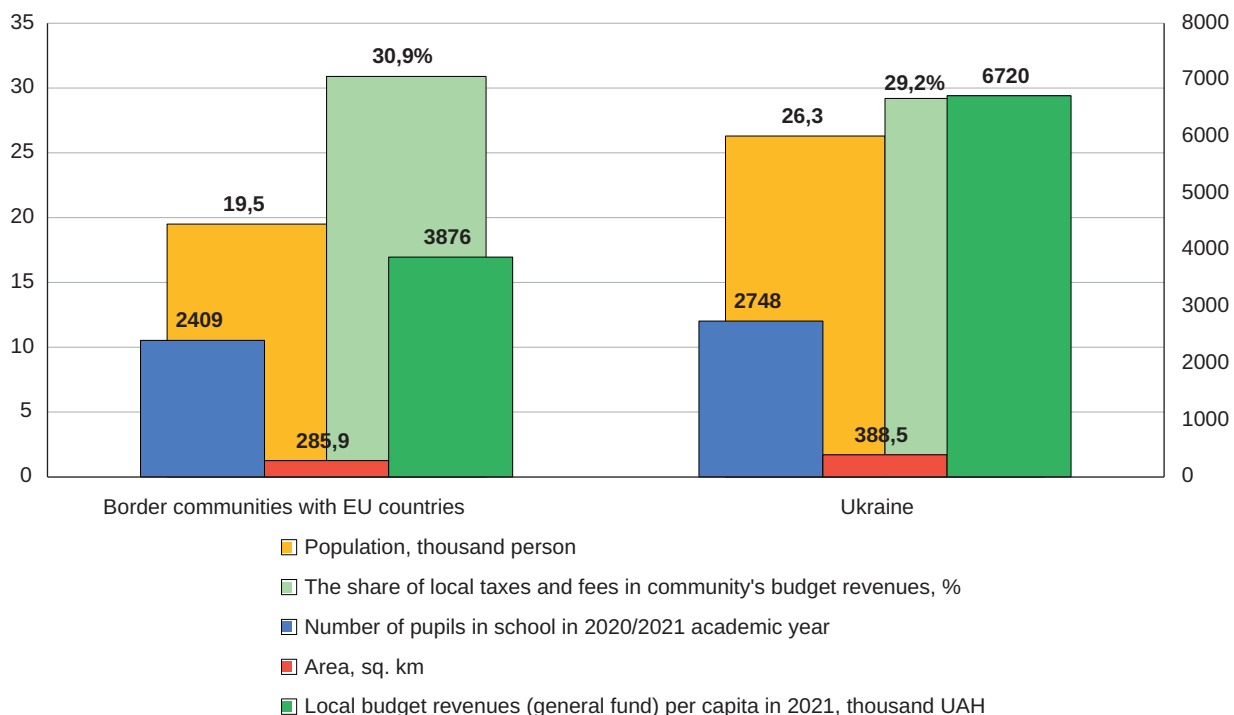


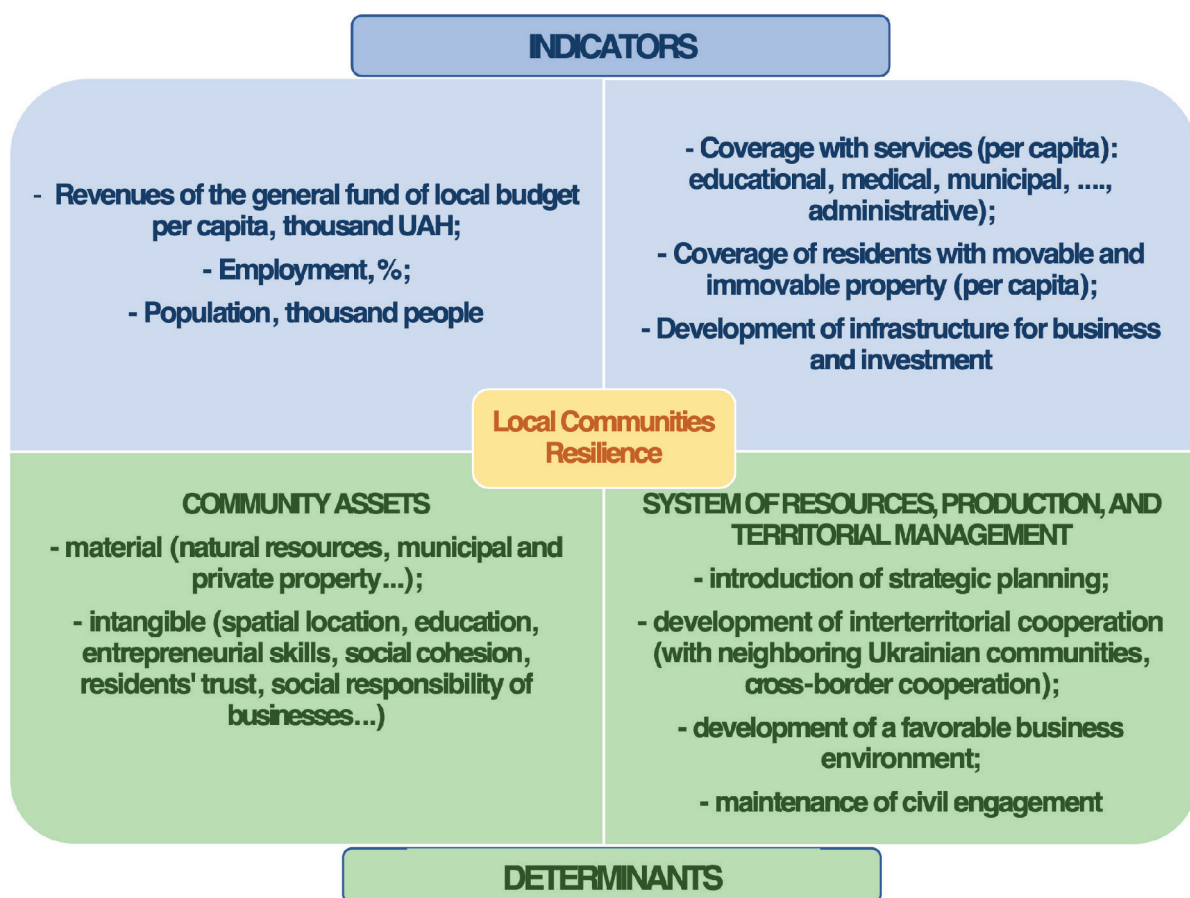
Figure 4. The average value of several indicators in border communities and communities in Ukraine in 2021

Source: Own elaboration based on the Ministry of Communities and Territories Development (2021).

The average area of a border community is 285.9 sq. km, which is 26% less than the average area of communities in Ukraine. The average number of residents and pupils in school in the 2020/2021 academic year are less for border communities than for other communities in Ukraine.

Total local budget revenues (of general fund) per person is half the Ukrainian average. So, there is a relatively lower level of economic activity in the border communities.

Considering the existing approaches to the research and understanding of resilience, ***the resilience of local communities is determined by their ability to cope with external challenges, shocks, disruptions, etc.*** In theory, a community with more resources is more resilient and can withstand various external shocks more efficiently and quicker. Therefore, the well-being of communities and their residents is the key to their resilience. The volume of resources and efficiency of their use are demonstrated by local budget revenues as financial resources can be channeled into reserve funds in the event of emergencies. Economic activity in a community is defined by employment within the territory of the respective community. The size of the community resource that can be directed at the stabilisation of situation and maintenance of further resilient development in case of external challenges will depend on the number of community residents, especially the number of the working-age population and its level of employment. Therefore, parameters such as local budget revenues of the general fund per capita (thousand UAH), employment (%), and population (thousand people) are key indicators of the local community resilience (see Figure 5).



**Figure 5.** The indicators and determinants of local community resilience

Source: Own elaboration.

Meanwhile, community resilience is determined not only by the capacity to accumulate enough resources to secure its further development under any circumstances but also by the structure of the consumption of these resources. Securing access to services (per capita) such as educational, medical, municipal, etc. – and the development of infrastructure for business and investment – is the essential direction of the use of these resources. Residents' provision of movable and immovable property (per capita) is another important resilience indicator. Considering these indicators, we assume that resilience will be defined not only provided the higher rates of these indicators but also

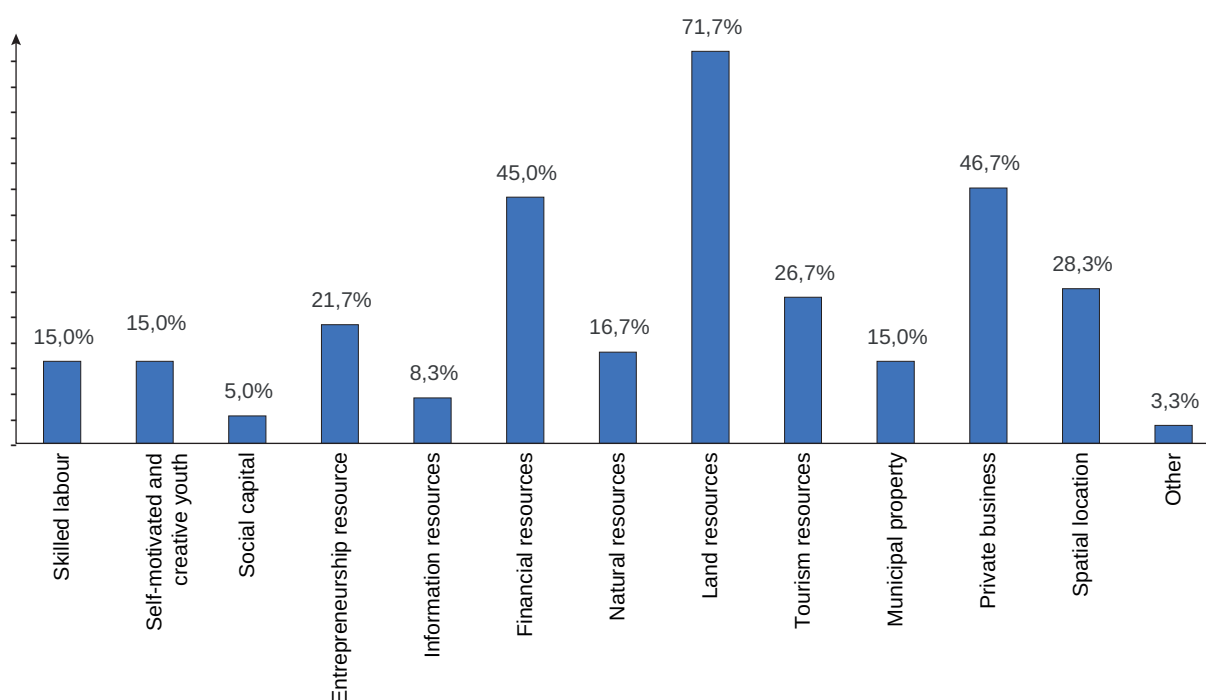
provided the positive growth dynamics of these indicators. It will increase a community's capacity to withstand external challenges and shocks.

TCs as socioeconomic systems are open and developing, actively interacting with the external environment. Therefore, the resilience of a TC will determine the resilience of the region and the country, and, in turn, it will depend on them. The resilience of border communities will also be largely determined by the resilience of adjacent border areas (communities, regions, etc.)

### 3.2. Border community “depression trap” – assessing the situation and new opportunities

In order to assess the level of development of border communities, we conducted a sociological survey, according to which most communities are not absolutely sure if they are satisfied with their current level of economic development: 35% are rather satisfied, while 30% are rather unsatisfied with the development situation. Only 8 representatives of communities marked their satisfaction with the way their communities are developing.

Almost three-quarters of the respondents see land resources as the basis for the economic development of their communities (Figure 6). Financial resources and private business are other essential factors for community development, as indicated by 45% of the respondents. Social capital (5%) and information resources (8%) are the least important for the communities' economic development. Some respondents mention that proximity to the state border is a key driver of their community's development.



**Figure 6.** Respondents' views on the resources that secure their communities' economic development (%)

Source: Own elaboration based on sociological survey.

The importance of land resources in ensuring the development of border TCs is evidenced by a fairly close relationship between the profitability of community land and the amount of revenue generated for the general fund of the local budget per capita, which in 2021 was ~ 0.6.

According to the survey, the retail trade (76.7%), agriculture (crop production, animal husbandry) (68.3%), and forestry and logging (33.3%) are the leading types of economic activity in border territories. Meanwhile, the processing industry accounts only for 22.1% of the respondents' choices. The prevailing commodity-dependent types of economic activity with low value explains the poor economic development of these territories.

The entrepreneurship development defines the communities' socioeconomic development as it is the precondition of investment attraction, additional jobs, growing financial capacity of the population, reduced migration, etc. Sadly, the research shows that 55.2% of border communities have less than 10 enterprises functioning within their territory. 11 to 20 enterprises function in 18.3% of the border communities, while only 12.1% of the respondents indicated that there are over 51 enterprises in their territories. Even more threatening is the fact that a quarter of border communities receive no revenue for local budgets from local businesses. A small number of enterprises registered in the community is emphasised by 11.7% of the respondents, who mention that there are up to ten enterprises in their communities. Moreover, most communities have only one or two registered enterprises.

About 40% of the respondents claim that most residents in their communities are employed abroad. Only 26% of the surveyed representatives of local communities indicate that most people are employed in the administrative unit where they live. Eight communities emphasise that involvement in border trade is a major occupation for their residents.

According to the respondents, low level of investment attraction (65%), problems with waste processing and disposal (67%), and absent or outdated sewerage systems (52%) are the main problems that the border areas in Ukraine face (Figure 7). The threat of emergencies (42%) is another important issue. A quarter of the respondents also mentioned the low demand for local products and limited access to good-quality drinking water (22% each). The lack of information for entrepreneurs regarding launching and developing business and entering foreign markets, the lack of professional managerial staff, and the problems involved in preserving objects of cultural heritage are less often but still rather essential for the territories. They are specified by 15% of the respondents.

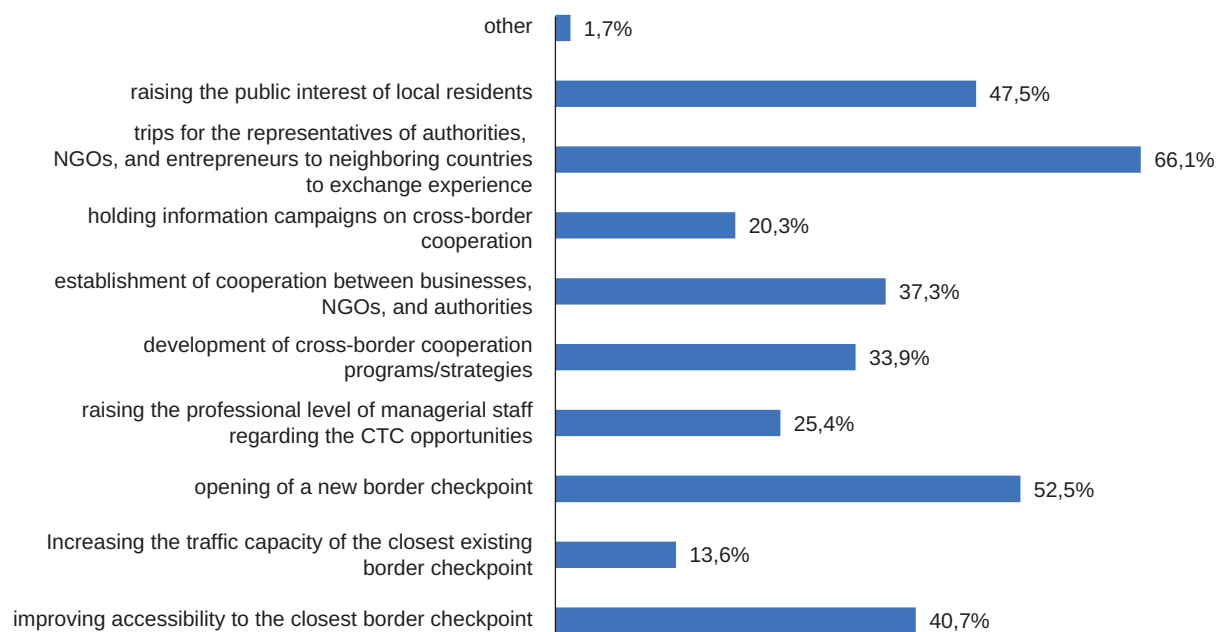


**Figure 7.** Respondents' views on the problems especially relevant for their territories, %

Source: Own elaboration based on sociological survey.

Most of the respondents (66.1%) say that the organisation of delegations for the representatives of authorities, NGOs, and entrepreneurs to neighbouring countries to share their experiences can boost the development of cross-border cooperation with the participation of their communities (Figure 8). Almost half of the respondents mentioned the opening of a new border checkpoint and raising the public interest of local residents. The improvement of accessibility to the closest border checkpoint (40.7%), the establishment of cooperation between businesses, NGOs, and authorities (37.3%), and the development of cross-border cooperation programmes and strategies (33.9%)

are often cited as possible ways to promote CBC development. Increasing the traffic capacity of the closest existing border checkpoint was the least selected by the respondents.



**Figure 8.** Respondents' views on the directions to boost cross-border cooperation with the participation of their communities, %

Source: Own elaboration based on sociological survey.

The respondents' views over the projects or initiatives carried out by their communities jointly with border communities of neighbouring states that would be beneficial to their economic development show that they see the development of tourism and relevant infrastructure as the most efficient and quickest way to attract funds and invest them in the communities' socioeconomic growth and the development of human resources. The other most urgent activities or projects for communities to be implemented together with border communities of neighbouring states are holding cultural events (26.2% of the respondents), joint production (including the agricultural production) (19.0% of the respondents), construction/renovation of water treatment and sewerage facilities (19.0% of the respondents), and the development of education, sports, culture, and arts (19.0% of the respondents).

The single understanding of the perspectives and problems of local development in the areas located close to the border in neighbouring countries, as well as how each of the areas may get involved in securing their socioeconomic growth in cross-border space, contribute to the development of resilient communities. For that matter, speaking about official documents, it is worth mentioning that building resilience in a cross-border area must be grounded in efficient institutional and legal frameworks, both joint and on each side of the border.

We have revealed that border communities were characterised by weaker economic activity, significant labour migration, and agricultural land use mainly for household production. Proximity to the border had been a disincentive which exacerbated the backwardness of many border communities. The assessment of the border communities' capacity showed that the border communities lagged far behind other Ukrainian communities in 2021 especially in terms of financial capacity. Therefore, we discovered that most border communities suffer from lower levels of socioeconomic development. Nevertheless, the establishment of a new basic administrative-territorial unit (territorial community), a new system of formation and use of community financial resources, and updating and approving community strategies may allow border communities to climb out of depression.

### 3.3. The resilience of border communities in the face of modern challenges

In 2020, communities in Ukraine as well as in most countries around the world faced challenges in the health care system as well as economic and social spheres caused by the COVID-19 pandemic. The Government of Ukraine applied strict precautionary measures to curb the pandemic, using a differentiated territorial approach. Meanwhile, fiscal support for entrepreneurship and vulnerable people was provided to overcome economic shocks.

We have analysed the impact of the pandemic in 2020–2021 on the formation and implementation of local budgets based on the example of 7 border TCs that had been consolidated before 2018 and remained the same (without change in the number of settlements which were amalgamated into a TC). The budget execution allows the community to function and increase the community capacity. Among the indicators of budget execution are local budget revenue per capita, the amount of capital expenditure per capita, budget subsidies (see. Tables 2–4).

**Table 2.** Local budget revenues in border communities in 2018–2021

Communities	Type	Local budget revenue per capita, UAH				Growth rate		
		2018	2019	2020	2021	2019/ 2018	2020/ 2019	2021/ 2019
Mamalyhivska	rural	1497,8	1865,4	2116,8	2638	1,25	1,13	1,41
Krasnoilska	town	774,1	1055,0	1202,4	1394	1,36	1,14	1,32
Selyatynska	rural	1687,9	2155,5	2573,0	3608	1,28	1,19	1,67
Tyachivska	city	5122,1	6402,6	6579,1	8093	1,25	1,03	1,26
Lytovezska	rural	2985,9	3310,7	3761,4	3695	1,11	1,14	1,12
Ustyluzka	city	3203,7	4356,1	4833,0	6455	1,36	1,11	1,48
Rivnenska	rural	7067,8	7071,9	<b>6494,9</b>	<b>6373</b>	1,00	<b>0,92</b>	0,90

Source: Own elaboration based on the Ministry of Communities and Territories Development (2021).

**Table 3.** Capital expenditure per capita in border communities in 2018–2021

Communities	Type	Capital expenditure per capita, UAH				Growth rate		
		2018	2019	2020	2021	2019/ 2018	2020/ 2019	2021/ 2019
Mamalyhivska	rural	581,8	629	695	503	1,08	1,10	<b>0,80</b>
Krasnoilska	town	477	880	754,8	350	1,84	<b>0,86</b>	<b>0,40</b>
Selyatynska	rural	1427	2113	863,1	1710	1,48	<b>0,41</b>	<b>0,81</b>
Tyachivska	city	2563,4	3079,7	3621	3657	1,20	1,18	1,19
Lytovezska	rural	1071,1	959,4	717,3	2619	0,90	<b>0,75</b>	2,73
Ustyluzka	city	1061,5	1026,9	596,6	289	0,97	<b>0,58</b>	<b>0,28</b>
Rivnenska	rural	3608,3	3438,5	2121,3	814	<b>0,95</b>	<b>0,62</b>	<b>0,24</b>

Source: Own elaboration based on the Ministry of Communities and Territories Development (2021).

Local budget revenue per capita increased by 1.03–1.19 times (in 2020) and 1.12–1.67 times (in 2021) in most of the above-mentioned communities despite the pandemic impact. Meanwhile, local budget revenue per capita in 2021 was 90% of its pre-crisis value in 2019 only in the Rivnenska rural community. The amount of local budget revenue varies from community to community, but most communities have shown approximately the same trend in filling their budgets with their own revenue.

**Table 4.** The level of subsidies to the budgets of border TCs in 2018–2021

Communities	Type	Level of subsidies (ratio of the base/reverse subsidy to the total amount of revenue), %*				Absolute increase, %		
		2018	2019	2020	2021	2019/ 2018	2020/ 2019	2021/ 2019
Mamalyhivska	rural	31,10	33,90	36,20	34,55	2,80	2,30	0,65
Krasnoilska	town	52,50	51,90	54,40	55,48	-0,60	<b>2,50</b>	<b>3,58</b>
Selyatynska	rural	26,10	23,70	24,50	25,79	-2,40	<b>0,80</b>	<b>2,09</b>
Tyachivska	city	-0,80	-0,20	0,00	-3,11	0,60	0,20	-2,91
Lytovezska	rural	-4,30	0,00	0,00	7,40	4,30	0,00	<b>7,40</b>
Ustyluzka	city	15,90	0,00	10,80	4,37	-15,90	10,80	4,37
Rivnenska	rural	3,80	2,80	4,60	5,53	-1,00	<b>1,80</b>	<b>2,73</b>

Source: Own elaboration based on the Ministry of Communities and Territories Development (2021).

\*\*“+” basic subsidy – transfer provided from the state budget to local budgets for horizontal equalisation of tax capacity of territories<sup>2</sup> (the community budget is subsidised);

“-” – reverse subsidy – funds transferred to the state budget from local budgets for horizontal equalisation of tax capacity of territories

Moreover, it is important to ensure not just an increase in own-source revenue, but a level of growth that would ensure the fulfilment of budget expenditures, especially the expenditures on development. The amount of capital expenditure per capita in 2021 amounted to 25–81% of its volume in 2019 in five out of seven border communities. A sharp drop in spending was a response to external shock, which serves to highlight communities' instability. However, the decline in capital expenditure correlated neither with the type of TC (city, town, or rural) nor with the level of its capacity. The Ustyluzka TC with a high capacity level (4.2 points out of 5) managed to finance capital expenditure per capita in 2021 in the amount of 28% of 2019 level.

This situation also affected the amount of subsidies for TC budgets. Budget subsidies for almost all communities increased between 0.80–10.80% in 2020–2021 with the exception of the Thyachivska TC. The Thyachivska TC became a donor and the reverse subsidy of it increased by 2.91% in 2021.

To sum up, there is an ambiguous relationship between the level of community capacity and its resilience. On the one hand, the Thyachivska TC is a city by type, with a high capacity level (3.6 points out of 5), has ensured the implementation of the budget of both revenues and expenditure as well as demonstrated financial and functional resilience. Conversely, the Ustyluzka TC, which is also a city type with a high capacity level, reduced capital expenditure by 3.5 times and increased the level of subsidies for its budget by 4.4%.

Therefore, it cannot be stated unequivocally that less economically-developed communities are less resilient. As experience regarding the development of Ukrainian communities during the pandemic and martial law shows, the tangible assets of a community are not decisive in ensuring its development. On a par with tangible, or sometimes even more significant, are the intangible assets of a community (spatial location, education, entrepreneurial skills, information communications, social cohesion, trust of residents, social responsibility of business, etc.)

In particular, before the pandemic, experts had primarily identified the cohesion of community residents (62.7%) and trust in local authorities (54.2%) as intangible assets with a major impact on the welfare of border communities.

The influence of these factors was especially decisive in the first months of the war. It was the self-organisation of community residents and their high level of trust that led to increased social cohesion, ensured the safety of community life, and allowed them to respond quickly to social demands in martial law (voluntary formations of TCs (territorial defence), volunteer movement).

<sup>2</sup> It is a mechanism that allows to „pull up” poorer communities and provide them with financial resources to finance the needs of the community.

No less important components in ensuring the resilience of local communities were the resilience of information support through the establishment of information communications (single information marathon, telegram channels, etc.) In circumstances of declining economic activity, the social responsibility of business is significant. To ensure stability in the filling of local and state budgets, many companies paid taxes in advance and are involved in maintaining the resilience of both communities and the country as a whole.

If we analyse the resilience of Ukrainian communities in war conditions during the whole 2022 and the first half of 2023, the determining factor is the security (communities that are located further from active hostilities are relatively more safer). The highest rates of growth of the actual revenues of the general fund for January-December 2022 compared to January-December 2021 were observed in such “safer” communities (Ministry of Finance of Ukraine, 2023). Accordingly, the smallest reduction in capital expenditures also was observed in these communities.

The decentralisation reform allowed the local self-government bodies to become more autonomous, self-sufficient, with adequate financial resources, which played a major role in their ability to face the challenges. In general, in 2022, local budgets ran a surplus, unlike the state budget, which was financing the security and defence sectors.

The decentralisation reform ensured the financial resilience of TCs and their ability to quickly adapt to the situation. Non-combat communities were able to host IDPs and provide them with adequate infrastructure and adequate public services.

During the war, the structure of local budget revenues underwent certain changes. In the structure of revenues of the general fund without transfers, the share of personal income tax (PIT) was 68.4% in 2022. PIT inflows to local budgets during January-December 2022 did not decrease compared to prior period. This is due, firstly, to the growth of deductions from the salaries of military personnel, and, secondly, the increase in the allocation rate of personal income tax to local budgets – from 60% to 64% from the beginning of 2022.

Therefore, the rate of the completion of local budgets by TCs varied significantly, depending on payments to military personnel. One community from the Ivano-Frankivska oblast and 2 communities from the Lvivska oblast were among the TOP-10 communities with the largest increase in general fund revenues (without transfers) in 2022.

Thus, the resilience of border communities in 2022 was determined to a large extent by a number of external factors: distance from active hostilities, the number of IDPs who relocated to the community, the presence of military units in the territory, the number of relocated enterprises. At the same time, the number of working-age population remains a key indicator of resilience. Given the large number of refugees abroad and the mobilisation of personnel for military service, local labour markets have significantly shrunk, and this is the biggest post-war challenge for future recovery and development of communities, regions, and the country.

## Conclusions

This paper identifies the main determinants and criteria for assessing the resilience of TCs in the Ukraine-EU cross-border area. A review of theoretical approaches and analysis of the results of the impact of COVID-19 on the functioning of local communities in terms of their budgets suggests that a more resilient community is one that has more resources and is able to use them more efficiently. Meanwhile, community resilience is determined not only by the ability to accumulate more resources to ensure its further development in circumstances of shock or crises, but also by the expenditure structure of their own resources. The main expenditure is focused on ensuring the availability and quality of services (per capita): educational, medical, utilities, etc., as well as the development of infrastructure for business and investment.

Unlike the negative worldwide trend in the collection of local revenues in 2020, COVID-19 did not significantly affect the local budgets in Ukraine. In the majority of the surveyed communities in 2020–2021, locally collected budget revenues per capita increased 1.03–1.19 times (in 2020) and 1.12–1.67 times (in 2021). Most communities, characterised by different amounts of budget own revenues, showed about the same trend in filling budgets with their own revenue. Thus, we can



state that there is an ambiguous connection between the level of financial capacity of communities and their resilience.

The thesis that less economically-developed communities are less resilient also remains controversial. The experience of the development of Ukrainian communities during the pandemic and martial law shows that the tangible assets of a community are not decisive in ensuring its development. It was the self-organisation of community residents and the high level of trust of residents that led to increased social cohesion, ensured the safety of community life, and allowed them to respond quickly to social demands in martial law (voluntary formations of TCs (territorial defence), volunteer movement).

According to the survey results, the development of border TCs is characterised by a low level of economic activity in their territory. Proximity to the border has so far played a major role as a disincentive, exacerbating the depression of many border communities. Therefore, we can state that most border communities today are characterised by a lower level of socioeconomic development.

The list of problems restraining the economic development of border areas is quite long. It includes the lack of investment resources, the lack of professional staff, the lack of information for entrepreneurs to launch and develop their businesses and to enter foreign markets, and low demand for local products. Yet, the problems with sewerage systems, waste disposal, and limited access to quality drinking water are the most severe for the communities' residents.

The problems can be solved partially by joining forces with the adjoining border areas of neighbouring countries. The phenomenon of cross-border cooperation provides a range of instruments that can strengthen the resilience of communities located close to the border.

Further research on the resilience of TCs in wartime conditions is necessary. Given the large number of refugees abroad and the mobilisation of personnel for military service, local labour markets have significantly shrunk, and this is the biggest post-war challenge for future recovery and development of communities, regions, and the country.

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### Reference List

- Bakushevych, I., Goshchynska, D., Martyniak, I. (2019). In: M. Fleychuk, U. Ganski, I. Khadzhymov, O. Moky, B. Semak (Eds.), *Decentralization and Innovative Entrepreneurial Ecosystem development for the EU-Ukraine Cross-border Cooperation* (pp. 139–152). Daugava Print.
- Bar-Kořelis, D., Dopierała, Ł. (2014). Ukrainian cross-border shoppers influence at the Polish and Romanian borders. A comparative study from Suceava and Lublin. *Revista Română de Geografie Politică*, 2, 78–87. Available at: <http://rrgp.uoradea.ro/art/2014-2/02-RRGP-282-Bar-Kolelis.pdf> [accessed: 15.05.2023].
- Borshch, O. (2014). Cross-border cooperation as a development factor for borderline territories of Ukraine. *European Journal of Law and Economics*, 37, 529–544. <https://doi.org/10.1007/s10657-012-9370-z>.
- Cassidy, K. (2014). Gender relations and cross-border small trading in the Ukrainian–Romanian borderlands. *European Urban and Regional Studies*, 1(20), 91–108. <https://doi.org/10.1177/0969776412463374>.
- Cinner, J., Barnes, M. (2019). Social dimensions of resilience in social-ecological systems. *One Earth*, 1(1), 51–56. <https://doi.org/10.1016/j.oneear.2019.08.003>.
- Cross-border Cooperation Programme Poland–Belarus–Ukraine (2014–2020, 2021). *Joint paper on Interreg NEXT Strategic Programming 2021–2027*. Available at: [https://www.pbu2020.eu/files/uploads/pages\\_en/pbu2021-2027/documents/EC%20-%20Joint%20paper%20on%20Interreg%20NEXT%20Strategic%20Programming%202021-2027.pdf](https://www.pbu2020.eu/files/uploads/pages_en/pbu2021-2027/documents/EC%20-%20Joint%20paper%20on%20Interreg%20NEXT%20Strategic%20Programming%202021-2027.pdf) [accessed: 15.05.2023].

- EUR-Lex (2021). *Regulation (EU) 2021/947*. Available at: <https://eur-lex.europa.eu/eli/reg/2021/947/oj> [accessed: 15.05.2023].
- European Commission (2021). *Neighbourhood, Development and International Cooperation Instrument – Global Europe (NDICI – Global Europe)*. Available at: [https://neighbourhood-enlargement.ec.europa.eu/funding-and-technical-assistance/neighbourhood-development-and-international-cooperation-instrument-global-europe-ndici-global-europe\\_en#:~:text=The%20total%20allocation%20for%20NDICI,the%20Americas%20and%20the%20Caribbean](https://neighbourhood-enlargement.ec.europa.eu/funding-and-technical-assistance/neighbourhood-development-and-international-cooperation-instrument-global-europe-ndici-global-europe_en#:~:text=The%20total%20allocation%20for%20NDICI,the%20Americas%20and%20the%20Caribbean) [accessed: 15.05.2023].
- European Commission (2022). *Interreg NEXT Programmes*. Available at: [https://ec.europa.eu/regional\\_policy/policy/cooperation/european-territorial/next\\_en](https://ec.europa.eu/regional_policy/policy/cooperation/european-territorial/next_en) [accessed: 15.05.2023].
- European Commission (2022). *The Recovery and Resilience Facility*. Available at: [https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility\\_en](https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en) [accessed: 15.05.2023].
- European Union (2022). *A new strategic agenda for the EU, 2019–2024*. Available at: [https://european-union.europa.eu/priorities-and-actions/eu-priorities\\_en](https://european-union.europa.eu/priorities-and-actions/eu-priorities_en) [accessed: 15.05.2023].
- European Union (2022). *National recovery and resilience plans*. Available at: [https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility\\_en#national-recovery-and-resilience-plans](https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en#national-recovery-and-resilience-plans) [accessed: 15.05.2023].
- Haken, H. (2009). Synergetics: Basic concepts. In: R.A. Meyers (Ed.), *Encyclopedia of Complexity and Systems Science* (pp. 8926–8946). Springer.
- Kish, Y. (2018). Transborder cooperation of border regions in Ukraine and Hungary. *Viešoji Politika ir Administravimas*, 1, 68–83. Available at: <https://www.ceeol.com/search/article-detail?id=665363> [accessed: 15.05.2023].
- Lačný, M. (2017). Mutual trade and cross-border economic interaction of Ukraine and Slovak Republic. *Journal of Economic Development, Environment and People*, 3, 92–102. Available at: <https://www.ceeol.com/search/article-detail?id=572415> [accessed: 15.05.2023].
- Martin, R., Sunley, P. (2015). On the notion of regional economic resilience: Conceptualization and explanation. *Journal of Economic Geography*, 15(1), 1–42. Available at: <https://doi.org/10.1093/jeg/lbu015> [accessed: 15.05.2023].
- Ministry of Finance of Ukraine (2023). *Fulfilment of local budget revenues for 2022*. Available at: <https://mof.gov.ua/uk/vykonannia-dokhodiv-mistsevykh-biudzhetiv> [accessed: 15.05.2023].
- Ministry of Health of Ukraine (2020). *Business support*. Available at: <https://covid19.gov.ua/prohramy-pidtrymky-biznesu> [accessed: 15.05.2023].
- OECD (2020). *The territorial impact of COVID-19: Managing the crisis across levels of government*. Available at: [https://read.oecd-ilibrary.org/view/?ref=128\\_128287-5agkkojaaa&title=The-territorial-impact-of-covid-19-managing-the-crisis-across-levels-of-government](https://read.oecd-ilibrary.org/view/?ref=128_128287-5agkkojaaa&title=The-territorial-impact-of-covid-19-managing-the-crisis-across-levels-of-government) [accessed: 15.05.2023].
- Patel, S.S., Rogers, M.B., Amlôt, R., Rubin, G.J. (2017). What do we mean by “community resilience”? A systematic literature review of how it is defined in the literature. *PLOS Currents: Disasters*, 9. Available at: <https://currents.plos.org/disasters/article/what-do-we-mean-by-community-resilience-a-systematic-literature-review-of-how-it-is-defined-in-the-literature/> [accessed: 15.05.2023].
- Plahta, L.P., Prytula, M.G. (2001). Impulsni protsesy na zvazhenykh orhrafakh [Impulse processes on weighted digraphs]. *Bulletin of Lviv University. Series of Applied Mathematics and Computer Science*, 2, 209–219.
- Plahta, L.P., Prytula, M.G., Prytula N.M. (2001). Stiikist impulsnykh protsesiv na zvazhenykh orhrafakh [Stability of impulse processes on weighted digraphs]. *Bulletin of Lviv Polytechnic State University: Computer Engineering and Information Technologies*, 392, 239–244.
- Platts-Fowler, D., Robinson, D. (2016). Community resilience: A policy tool for local government? *Local Government Studies*, 42(5), 762–784. <https://doi.org/10.1080/03003930.2016.1186653>.
- Resolution CMU (2015). *On approval of the methodology of formation of capable territorial communities*. Available at: <https://zakon.rada.gov.ua/laws/show/214-2015-%D0%BF#Text> [accessed: 15.05.2023].
- Roberts, F. (1976). *Discrete Mathematical Models with Applications to Social, Biological, and Environmental Problems*. Prentice-Hall.
- Sharifi, A. (2016). A critical review of selected tools for assessing community resilience. *Ecological Indicators*, 69, 629–647. <https://doi.org/10.1016/j.ecolind.2016.05.023>.
- Simmie, J., Martin, R. (2010). The economic resilience of regions: Towards an evolutionary approach. *Cambridge Journal of Regions, Economy and Society*, 3(1), 27–43. <https://doi.org/10.1093/cjres/rsp029>.

- Sotnikov, Y., Kravchenko, I. (2013). Cross-border cooperation development of Ukraine: Forms and instruments of competitiveness increase. *Economics and Management*, 18(1), 95–101. <https://doi.org/10.5755/j01.em.18.1.4379>.
- Varnaliy, Z., Vasylytsiv, T. (2016). Factors and ways of cross-border cooperation development of border regions of Ukraine. *The USV Annals of Economics and Public Administration*, 3(16), 66–71. Available at: <http://annals.seap.usv.ro/index.php/annals/article/view/902/821> [accessed: 15.05.2023].
- Wink, R. (2013). Regional Economic Resilience: European experiences and policy issues. *Raumforschung und Raumordnung*, 72(2), 85–91. <https://doi.org/10.1007/s13147-013-0265-4>.
- Zarichna, O. (2018). New forms of cross-border cooperation. *Management*, 2(28), 99–107. <https://doi.org/10.30857/2415-3206.2018.2.8>.