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This study examines how the Tisza European Grouping of Territorial Cooperation (Tisza EGTC) at the EU-Ukraine border has evolved from a legal-technical cooperation instrument into a resilience node in a multi-crisis context. Anchoring the analysis in resilience debates in regional and cross-border governance, it first situates the Upper Tisza basin as a laboratory where cohesion, neighbourhood and enlargement policy logics overlap. It then reconstructs the genesis, governance and financial model of the Tisza EGTC, highlighting the importance of Hungarian core funding and balanced multi-level structures. The empirical core offers a project-level analysis of five thematic clusters – environmental risk management, waste and circular economy, border efficiency, institutional capacity-building and multilingual accessibility – showing how projects such as REVITAL I, ZeroWaste, Secure Borders, LEAD-UP, PLANNING4U and Language APL generate anticipatory capacities, institutional learning and cross-border problem-solving routines. The article argues that resilience in border regions is less about individual projects than about institutional architectures that combine hard and soft interventions over time. It concludes with reflections on the transferability of the Tisza model to Slovak-Ukrainian cooperation, outlining legal, financial and political preconditions, and pointing to the need for comparative research on EGTCs at external EU borders.

Keywords:

Cross-border resilience, EU-Ukraine border, Tisza EGTC.

THE TISZA EGTC AS A RESILIENCE TOOL FOR CROSS-BORDER COOPERATION

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Introduction

The EU-Ukraine border has moved from being a distant external frontier of the Union to a highly politicised and securitised contact zone, shaped first by the annexation of Crimea and then by Russia's full-scale invasion in 2022 (Freudlsperger – Schimmelfennig, 2023, pp. 843-871). This eastern borderland concentrates multiple vulnerabilities: military risk and security dilemmas, large-scale refugee and labour migration, environmentally fragile river basins such as the Tisza, and structurally weaker, peripheral regional economies. Border-regional research shows that such areas experience repeated "mobility shocks" and crises but also develop specific repertoires of adaptation and "border-regional resilience" rooted in cross-border institutions and trust (Prokkola, 2019, pp. 1587-1606; Hippe – Bertram – Chilla, 2024, pp. 186-207).

In parallel, "resilience" has become a central organising principle of EU policy, particularly after the financial crisis, the COVID-19 pandemic and the war in Ukraine. It is now embedded in the Recovery and Resilience Facility

and in the 2021-2027 Cohesion Policy framework, where it means "the ability to face economic, social and environmental shocks or persistent structural changes in a fair, sustainable and inclusive way" (Regulation (EU) 2021/241, 2021, art. 2(5)). This agenda stresses multilevel, place-based governance and cross-border functional regions as key arenas for resilience-building. The European Grouping of Territorial Cooperation (EGTC), created by Regulation 1082/2006 and revised in 2013, offers a stable legal personality for territorial cooperation across borders. Initially conceived as an operational vehicle for EU-funded programmes, EGTCs have increasingly been interpreted as multilevel governance platforms and even "supraregional" institutions that can coordinate strategic development across borders, including with third countries (Spinaci – Vara-Arribas, 2009, pp. 5-13; Evrard, 2016, pp. 513-537; Sararu, 2014, pp. 150-162). The Tisza EGTC, involving Hungarian counties and the Transcarpathian regional council, is the first grouping to include a third-country member from Ukraine and therefore a pioneering institutional laboratory at the EU's eastern border (Balogh, 2021, p. 51; European Parliament, 2023).

Against this background, the article addresses a core puzzle: under what conditions can an institutional instrument such as an EGTC evolve from a relatively technical implementation vehicle for projects into a node of territorial resilience at a highly exposed external EU border? Building on the experience of the Tisza EGTC, the study asks three interrelated research questions:

(1) How can an EGTC at the EU-Ukraine border develop functions that strengthen the capacity of local and regional actors to anticipate, absorb and transform in the face of war-, migration- and environment-related shocks, rather than only managing individual cross-border projects?

(2) Through which phases, mechanisms and partnerships have the Tisza EGTC moved from a mainly legal-institutional framework to an operational actor in fields such as environmental risk management, waste treatment and social support along the Tisza basin? (3) Which institutional design features, governance practices and cooperation routines from this model are potentially transferable to the Slovak-Ukrainian border, with its partly similar but also distinct geopolitical and socio-economic configuration?

The study offers three types of contribution. Empirically, it provides a detailed case study of the first EGTC involving a third-country member at the EU's eastern border, thus adding to the still limited literature on EGTCs beyond internal EU borders (Sararu, 2014, pp. 150-162; Evrard, 2016, pp. 513-537; Spinaci – Vara-Arribas, 2009, pp. 5-13). Conceptually, it seeks to operationalise "resilience" for cross-border cooperation practice by linking the border-regional resilience debate (Prokkola, 2019, pp. 1587-1606; Hippe – Bertram – Chilla, 2024, pp. 186-207) with the emerging policy understanding of territorial resilience in EU cohesion and neighbourhood frameworks. In policy terms, the article draws out lessons for the design of institutional cooperation at the Slovak-Ukrainian border, where EGTCs and similar groupings could play a stronger role as resilience-oriented governance nodes in the context of Ukraine's EU accession trajectory and the long-term reconstruction of its western borderlands (Freudlsperger – Schimmelfennig, 2023, pp. 843-871).

Theoretical framework and research design

Resilience in cross-border and regional governance

In the broader regional studies literature, "resilience" has evolved from a mainly ecological concept – the capacity of a system to absorb disturbance and reorganise while undergoing change – into a contested umbrella notion applied to cities and regions (Christopherson – Michie – Tyler, 2010, p. 3; Davoudi, 2012, p. 299). While early work distinguished between engineering and ecological resilience, more recent contributions stress evolutionary and place-based understandings that emphasise path dependency, institutional configurations and power relations (Davoudi, 2012, pp. 300-302). In this perspective, regional and borderland resilience concerns how territories cope with and adapt to serial shocks – economic crises, environmental hazards, geopolitical ruptures – while maintaining or renewing de-

velopment trajectories (Christopherson – Michie – Tyler, 2010, pp. 4-6).

This shift is visible in EU cohesion and territorial cooperation policy, where resilience has become a key objective alongside economic, social and territorial cohesion. The Recovery and Resilience Facility, based on Article 175 TFEU – the same legal basis as cohesion policy – explicitly links recovery investments with long-term territorial resilience and convergence (European Parliament, 2024, p. 2; European Commission, 2024). At the same time, recent work on territorial resilience argues that resilience should be understood as a multi-dimensional, territorially embedded attribute, depending on local capacities, governance arrangements and cross-border functional linkages rather than on isolated sectoral measures. In border regions, resilience debates intersect with the long-standing concern for territorial cohesion and Europeanisation: they highlight how institutional thickness, cross-border trust and multi-level arrangements shape the ability of border areas to manage crises and exploit integration opportunities (Christopherson – Michie – Tyler, 2010, p. 7; Medeiros, 2024, p. 4).

Border-specific research has begun to develop the notion of border-regional resilience, stressing that peripheral internal and external borderlands are exposed to compounded environmental, socio-economic and geopolitical pressures, but also generate specific adaptive repertoires through cross-border institutions and everyday cooperation (Prokkola, 2019, pp. 1588-1589). Empirical analyses show that convergence and resilience patterns in EU border regions are strongly conditioned by cross-border accessibility, institutional cooperation and integration into wider networks (Hippe – Bertram – Chilla, 2024, pp. 187-189). For EU external borders – including the EU-Ukraine frontier – this literature suggests that resilience depends not only on EU funding flows, but on the capacity of cross-border governance frameworks to stabilise expectations, coordinate investments and manage cross-border risks.

EGTCs as legal-institutional instruments

Within this governance landscape, the European Grouping of Territorial Cooperation (EGTC) is a relatively new legal instrument created by Regulation (EC) No 1082/2006 and amended in 2013. EGTCs are EU law entities with legal personality, enabling regional and local authorities from at least two Member States to plan and implement joint actions and manage EU-funded programmes across borders (Regulation (EC) No 1082/2006, 2006, p. 19; Spinaci – Vara-Arribas, 2009, pp. 5-6). The regulation grants EGTCs the capacity to act on behalf of their members, to adopt a convention and statutes defining their competences and organs, and to hold and manage a budget (Regulation (EC) No 1082/2006, 2006, p. 20). In practice, EGTCs are used for a wide spectrum of tasks: project implementation, provision of cross-border services, strategic planning, or even managing entire territorial cooperation programmes (Caesar, 2017, p. 248; Evrard, 2016, pp. 514-515).

At external borders, EGTCs face additional legal and financial constraints. Participation of partners from third countries depends on their national legislation and on the design of European Neighbourhood Instrument (ENI) and Interreg NEXT programmes (European Parliament, 2015, pp. 22-24; Regulation (EU) 2021/1059, 2021, art. 3). Nevertheless, the instrument has gradually been opened to the inclusion of non-EU members and to the management of external cross-border cooperation strands. Analysts therefore interpret the EGTC as a flexible tool that can "harden" previously soft, network-based forms of cross-border cooperation, by providing a durable legal shell and decision-making structure (Caesar, 2017, pp. 247-249). Empirical studies highlight their potential to operate as multi-level governance platforms and "supraregional" coordinators of cross-border development strategies (Evrard, 2016, pp. 518-520; Sararu, 2014, pp. 150-151).

The Tisza EGTC, bringing together Szabolcs-Szatmár-Bereg County and the City of Kisvárda on the Hungarian side with Zakarpattia Oblast on the Ukrainian side, fits into this broader family as the first EGTC with a Ukrainian member, established at an external EU border (CESCI, 2021, p. 3; Tisza EGTC, 2021). Its location along the Upper Tisza basin and the EU-Ukraine border places it at the intersection of environmental risks, socio-economic peripherality and geopolitical instability. As such, it offers a particularly relevant case for examining how an EGTC can move

beyond technical project management towards functioning as a resilience node for a wider cross-border region.

Research design and sources

Methodologically, the article adopts a single-case qualitative design centred on the Tisza EGTC. Case-study approaches are widely used in regional and border studies to explore complex governance arrangements and to trace causal mechanisms in depth rather than breadth (Christopherson – Michie – Tyler, 2010, p. 4; Prokkola, 2019, p. 1591). The choice of Tisza EGTC is theoretically driven (pioneering case) and justified by its status as the first EGTC including a Ukrainian region and by its extensive portfolio of resilience-relevant projects.

The empirical analysis draws on several types of material. First, founding and legal documents of the EGTC – the convention, statutes and registration acts – are used to reconstruct its institutional design, governance structure and formal competences. Second, strategic documents, in particular the "Cohesion Analysis and Integrated Development Strategy" of the Tisza EGTC, provide information on the socio-economic and environmental context and on the grouping's strategic priorities (CESCI, 2021, pp. 3-6). Third, project applications and publicly available summaries of key projects – including REVITAL I, ZeroWaste and ZeroWaste 2.0, Secure Borders, LEAD-UP, PLANNING4U and Language APL – are analysed to identify objectives, partners, budgets, outputs and territorial targeting. These documents are complemented by materials produced by CESCI and other expert organisations involved in EGTC support, as well as secondary literature on EGTCs and cross-border governance (Spinaci – Vara-Arribas, 2009; Caesar, 2017; Evrard, 2016; Sararu, 2014).

The analysis proceeds in two steps. First, it reconstructs the institutional trajectory of the Tisza EGTC, from its establishment to its current governance and funding model. Second, it examines the project portfolio through the lens of resilience, grouping activities into environmental/risk management, infrastructural and service provision, institutional capacity-building, and socio-cultural or economic enablement. On this basis, the article assesses the extent to which the Tisza EGTC can be interpreted as a resilience node and identifies elements that may be transferable to the Slovak-Ukrainian border context.

EGTCs at the EU-Ukraine border

The EU-Ukraine border in the Upper Tisza basin brings together four countries – Hungary, Slovakia, Romania and Ukraine – in a compact cross-border region structured around the river and its tributaries. Hydrologically, the basin has long been treated as a functional unit in international water-management frameworks: all five Tisza countries (including Serbia) cooperate under the Updated Integrated Tisza River Basin Management Plan, which highlights shared flood risk, upstream-downstream pollution linkages and the need for joint prevention and monitoring measures (ICPDR, 2019, pp. 1-4; 14-18). In territorial terms, this configuration combines a tightly interdependent river system with a politically fragmented border landscape marked by the EU's Schengen external frontier and Ukraine's candidate-country status, creating a dense overlay of regulatory, infrastructural and environmental interdependencies.

The main cross-border challenges in this segment are documented in both EU programme materials and regional analyses. Flood and landslide risks in the mountainous Ukrainian part of the basin, combined with low-lying, densely settled floodplains on the Hungarian side, generate recurrent vulnerability to extreme hydrological events (ICPDR, 2019, pp. 2-4). Legacy pollution and geohazards around the Solotvyno salt mine represent a particularly acute threat to water quality in the Tisza, with potential implications for four states; recent geospatial and geotechnical research confirms significant deformation, subsidence and the risk of saline infiltration into the river system (Pukanská et al., 2023, p. 2). These concerns are explicitly reflected in regional strategic documents, which identify Solotvyno and other mining-related hazards as key cross-border environmental risks requiring joint monitoring and intervention (Tisza EGTC, 2017, pp. 2-4).

Socio-economically, the Upper Tisza region is characterised by peripherality within national space-economies, dependence on agriculture and low value-added services, asymmetric industrial capacities, and marked income and

wage gaps between the Hungarian and Ukrainian sides (Tisza EGTC, 2017, pp. 6-10). Weak secondary and local road networks, bottlenecks at road and rail border-crossing points, and limited public transport options further reinforce the sense of "distance" across what is, geographically, a short span (Tisza EGTC, 2017, pp. 4-6). Such structural constraints are typical of cross-border regions at the EU's external frontier, where functional interdependence is high but infrastructural and institutional connectivity remains partial and uneven (Prytula et al., 2019, pp. 6-8).

Cross-border interaction is further shaped by pronounced linguistic and ethnic diversity. Zakarpattia oblast hosts substantial Hungarian, Romanian, Slovak and Roma minorities alongside the Ukrainian majority, while the Hungarian border districts themselves are characterised by Roma communities and pockets of Ruthenian and Ukrainian population (Tisza EGTC, 2017, pp. 11-12). This diversity reflects long-standing cultural interdependencies, yet it also produces language barriers in access to public services, information and labour markets. Recent multilingualism initiatives – including the "Language Accessibility in Public Life (Language APL)" project under Interreg NEXT HU-SK-RO-UA – explicitly frame bilingual front desks, multilingual forms and online portals as tools to mitigate such barriers and improve everyday cross-border accessibility for citizens and small and medium-sized enterprises (Language APL, n.d., pp. 2-3).

From a policy perspective, the EU-Ukraine border segment has increasingly functioned as a "laboratory" where different EU policy logics intersect. ENPI/ENI CBC and, more recently, Interreg NEXT HU-SK-RO-UA programmes have been designed to address common environmental problems, improve border-crossing facilities and strengthen people-to-people contacts in a context of "efficient and secure borders" (European Commission, 2015; Hungary-Slovakia-Romania-Ukraine ENI CBC Programme, 2017). At the same time, cohesion-policy concepts such as territorial cohesion, functional regions and multi-level governance have progressively been applied to this external frontier, including through support for Euroregions and other cross-border structures that seek to transform border peripheries into functional cross-border regions (Czimre, 2001, p. 176; Prytula et al., 2019, pp. 7-10). Ukraine's evolving association and now candidate status adds an enlargement logic, whereby cross-border projects and institutions are expected to support approximation to EU norms and practices in fields ranging from environmental management to border security and administrative capacity-building (Prytula et al., 2019, pp. 14-16).

Within this setting, the creation of the Tisza EGTC in 2015 marked a qualitative step in institutional innovation. The amended EGTC Regulation 1302/2013 opened participation to authorities from third countries sharing a border with an EU member state (European Union, 2013), making it legally possible to establish a grouping that combines EU and non-EU territories under a single legal personality. Building on this framework, Zakarpattia Regional Council, Szabolcs-Szatmár-Bereg County and the City of Kisvárda created the Tisza EGTC, the first EGTC to include a Ukrainian regional authority as a full member; scholarly and policy analyses highlight this as a precedent for Ukraine's deeper integration into EU territorial-cooperation structures (Prytula et al., 2019, p. 174). In effect, an instrument originally conceived for internal cohesion policy – endowed with EU legal personality, stable governance structures and the capacity to manage EU funds – was transplanted into the context of an external Schengen border. The Tisza EGTC has thus become an experimental node where cohesion, neighbourhood and enlargement policy logics intersect, and where "resilience" is increasingly operationalised not only through sectoral infrastructure projects, but through the capacity of local institutions to plan, coordinate and absorb shocks in a complex, multi-level cross-border environment (Zillmer, 2014, pp. 4-5; Tisza EGTC, 2017, pp. 18-20).

The Tisza EGTC: formation, governance and funding model

Genesis

The Tisza EGTC was formally registered on 26 October 2015 on the Hungarian-Ukrainian border. Its founding members are Szabolcs-Szatmár-Bereg County and the City of Kisvárda on the Hungarian side, and the Zakarpattia Regional Council on the Ukrainian

side (European Parliament, 2023, p. 30; Tisza EGTC, 2015, p. 1). The grouping covers 18,704.4 km² with a population of around 1.8 million inhabitants and is headquartered in Kisvárda (European Parliament, 2023, p. 30).

Tisza EGTC emerged at the intersection of cohesion policy and neighbourhood policy logics. On the one hand, it builds on the long-standing Hungarian-Ukrainian euroregional and project-based cooperation around the Upper Tisza; on the other, it was explicitly conceived as a tool to "strengthen territorial cohesion and to promote Ukraine's Euro-Atlantic integration" (CESCI, 2017). In the wider EGTC landscape, it occupies a pioneering position: it was the first EGTC to involve a third-country member (the Transcarpathian Regional Council), a point emphasised both in Hungarian regional policy literature and in evaluations of Hungarian cross-border cooperation (Szabó, 2016, p. 59).

The Central European Service for Cross-Border Initiatives (CESCI) played a central brokerage role in this process. CESCI had been involved in the preparation and registration of several EGTCs around Hungary and developed a specialised "EGTC atelier" to support grouping managers (Svensson – Ocskay, 2015). In the case of Tisza EGTC, CESCI's own account underlines that it "actively participated in the establishment" of the grouping, from conceptual design through to legal-institutional preparation and the drafting of founding documents (CESCI, 2015; Svensson – Ocskay, 2015). This role continued in the preparation of the 353-page cohesion analysis and integrated development strategy (CESCI, 2016) and its later trilingual extract (CESCI, 2017).

From a resilience perspective, the genesis of Tisza EGTC is already significant. Rather than emerging merely as a technical vehicle for EU-funded projects, it was explicitly framed as a territorial platform meant to stabilise cooperation in a precarious geopolitical and legal environment. Its legal personality, multi-level partnership and direct anchoring in both EU and Ukrainian legal orders would later allow it to function as an intermediary "resilience node" capable of absorbing shocks and mobilising resources on both sides of the border.

Governance structure

Tisza EGTC's internal governance follows the standard EGTC template defined in Regulation (EC) No 1082/2006 and its amendments, but with some important contextual specificities. According to its Statute, the main bodies are (1) General Assembly, composed of the representatives of all members, as the supreme decision-making body; (2) Director (or managing director), responsible for day-to-day management and external representation; and (3) Control or supervisory body, ensuring financial control and compliance with national and EU rules (Tisza EGTC, 2015).

Given the small number of founding members, representation in the General Assembly is relatively balanced: both Hungarian and Ukrainian partners delegate elected representatives, ensuring parity in strategic decisions and budgetary choices (European Parliament, 2023, p. 30; Tisza EGTC, 2015). The Hungarian legal framework requires ex-ante national approval of the convention and statutes, while the Ukrainian side had to gradually adapt its legislation to allow a regional council to participate in an EU-law entity, a process described in detail by Benczi and Ocskay (2021, p. 64). This dual legal anchoring is itself a resilience feature: it stabilises cross-border cooperation regardless of short-term political changes on either side and creates a degree of protection against unilateral withdrawal.

Mechanisms of accountability and oversight are multi-layered. Internally, the General Assembly votes on annual work programmes, budgets and strategic documents; externally, national authorities monitor compliance with both Hungarian and EU regulations on EGTCs, while Ukrainian ministries have gradually developed procedures to follow the grouping's activities (European Parliament, 2023, pp. 29-31). CESCI's long-term accompaniment of the grouping – e.g. through the EGTC-monitor platform and expert support – adds a further "soft" layer of governance, enabling peer learning with other Hungarian EGTCs and diffusing innovative practices in project management and strategic planning (Svensson – Ocskay, 2015).

In terms of resilience, this governance architecture does two things. First, it embeds Ukrainian actors in a dense web of EU-style

multi-level governance, contributing to the Europeanisation of administrative routines (Benczi – Ocskay, 2021, p. 64). Second, the combination of formal statutes and informal expert networks allows the EGTC to adjust relatively quickly to external shocks – including the 2014 and 2022 escalations of Russian aggression – without losing its institutional continuity.

Financial and support model

Like most EGTCs, Tisza EGTC combines project-based funding with core institutional support. On the project side, it has been particularly active in ENI CBC / Interreg cross-border programmes and related EU instruments, implementing several large projects in environmental risk management and waste infrastructure, with a combined budget of around EUR 7.5 million (CoR, 2020).

What distinguishes Tisza EGTC within the EU EGTC family is its access to stable national core funding. Since 2011 the Hungarian government has provided financial and professional support to EGTCs with Hungarian members, amounting to approximately EUR 500-600,000 annually for the system as a whole (Benczi – Ocskay, 2021, p. 62). This subsidy is used to cover staff costs, office infrastructure and co-financing obligations for EU projects. As a grouping with its seat in Hungary, Tisza EGTC is among the beneficiaries of this scheme, and its own website explicitly acknowledges the support of the Ministry of Foreign Affairs and Trade (CESCI, 2015).

In most other Member States, EGTCs depend almost entirely on intermittent project funding and voluntary member contributions, which makes it difficult to retain staff or invest in long-term strategy development (CoR, 2020; Svensson – Ocskay, 2015). This makes the Hungarian model – and Tisza EGTC within it – relatively rare in the EU context. The availability of predictable institutional funding underpins (1) the maintenance of a small but stable professional team in Kisvárda; (2) continuous project generation and partnership management, rather than ad-hoc bids; (3) the ability to co-finance capital-intensive projects, such as waste management facilities or flood-protection infrastructure (Benczi – Ocskay, 2021, pp. 62-64).

From a resilience angle, this financial architecture functions as a backbone: it allows the EGTC to keep its organisational memory, maintain relationships with Ukrainian partners even in crisis periods, and quickly reorient its activities (for example, towards humanitarian assistance after 2022) without having to rebuild capacity from scratch (CESCI, 2024).

Strategic orientation and project portfolio

The strategic orientation of Tisza EGTC is laid out in detail in its cohesion analysis and integrated development strategy (CESCI, 2016). The documents and subsequent project portfolio reveal four main thematic pillars, closely linked to the specific vulnerabilities of the Upper Tisza basin and the wider EU-Ukraine borderland:

1) *Environmental and risk management* – The Tisza and its tributaries are highly prone to floods, flash-floods and pollution, including from upstream mining activities. Tisza EGTC has positioned itself as a coordinator of cross-border environmental risk management, participating in projects that combine infrastructural investments with planning tools and public awareness. A flagship initiative in this field is the project aimed at the recultivation of the collapsed salt mines in Solotvyno and the reduction of saline pollution in the Tisza, carried out under an Interreg / ENI CBC scheme (CoR, 2020).

2) *Waste management and circular economy* – A second strategic pillar addresses the chronic deficits of municipal solid waste management in Zakarpattia. Tisza EGTC has been instrumental in preparing and implementing the first cross-border waste management projects, including the construction of a solid waste selection centre and the elaboration of the Waste Management Strategy of the Transcarpathian Region until 2030 (Tisza EGTC, 2019; Ocskay, 2021). These initiatives, supported by Hungarian and EU funds, have both infrastructural and governance components: they create physical facilities while also introducing EU-compliant planning and regulatory practices on the Ukrainian side.

3) *Border efficiency, security and connectivity* – A third focus concerns the functioning of the border itself: crossing procedures, small-scale infrastructure and the security-mobility nexus.

While border control remains a state competence, the EGTC has used projects such as Secure Borders, REVITAL I and PLANNING4U to support traffic management, small road improvements and joint planning of cross-border mobility solutions. These interventions aim at reducing the "friction of distance" created by the external Schengen border while aligning with EU priorities on security and critical infrastructure protection (European Parliament, 2023, pp. 30-31; CoR, 2020).

4) *Institutional capacity, planning, language accessibility and SME support* – Finally, Tisza EGTC invests in "soft aspects" – institutional capacity and social capital. Planning exercises, leadership academies and training schemes for local officials have been combined with projects on language accessibility (e.g. interpretation services, bilingual information) and SME support (e.g. advisory services, networking) (CESCI, 2017; Council of Europe, 2018). Projects such as LEAD-UP and Language APL illustrate this softer side of the portfolio, targeting both public administrations and private actors.

Taken together, these four pillars show that Tisza EGTC has moved well beyond a narrow project-implementation role. Its strategic portfolio combines hard (infrastructure, facilities) and soft (planning, training, network-building) interventions across multiple policy fields. This multi-dimensionality is crucial for resilience: flood protection investments are backed by cross-border planning routines; waste management facilities are embedded in long-term regional strategies; and border-related projects are accompanied by capacity-building and trust-building among local stakeholders. The EGTC thus acts as an intermediary structure that can translate abstract cohesion, neighbourhood and enlargement objectives into concrete, territorially anchored responses to shocks and chronic vulnerabilities at the EU-Ukraine border.

The Tisza EGTC as a resilience node: project-level analysis

This section examines how the Tisza EGTC's project portfolio operationalises resilience in the EU-Ukraine borderlands. Rather than treating projects as isolated interventions, the grouping uses them to build anticipatory capacities, redundancy and cross-border problem-solving routines – key dimensions in recent work on resilience in border regions (Böhm, 2024; Scott, 2022). The analysis focuses on five thematic clusters: environmental risk management; waste and circular economy; border efficiency; capacity-building and planning; and language accessibility and economic enablement.

Environmental protection and risk management: REVITAL I

The REVITAL I project, implemented under the Hungary-Slovakia-Romania-Ukraine ENI CBC 2014-2020 programme, addresses the long-standing environmental and safety risks posed by the Solotvyno salt mines to the Upper Tisza basin. Programme documentation highlights the project's aim to develop a joint, cross-border environmental monitoring and early-warning system for subsidence, sinkholes and groundwater contamination affecting both Ukrainian and downstream Hungarian territory.

With a budget of around €1.2 million, REVITAL I combines geotechnical and hydrological monitoring, shared databases and joint risk assessment procedures between Ukrainian and Hungarian institutions. These instruments translate previously fragmented national expert knowledge into a cooperative regime, including shared indicators of risk, agreed thresholds for intervention and coordinated responses in the event of sudden collapses or pollution incidents.

From a resilience perspective, this project reduces uncertainty and strengthens anticipatory capacity in a highly vulnerable area. Instead of relying solely on post-disaster support, the partners use common monitoring and modelling tools to identify emerging threats, which is consistent with arguments that cross-border projects can make cooperation itself more resilient to shocks if they institutionalise shared information and standard operating procedures (Böhm, 2024, pp. 7-9.).

REVITAL I also anchors the Tisza EGTC's role vis-à-vis Ukrainian authorities: by acting as lead beneficiary and interface with the ENI programme structures, the grouping gains experience in managing technically complex, risk-oriented projects, which later feeds into

other environmental and infrastructure initiatives. In this sense, environmental monitoring becomes a backbone function of the EGTC's resilience portfolio, not merely a one-off intervention.

Waste management and circular economy: ZeroWaste and follow-up actions

The ZeroWaste project ("Zero Waste: Theory for Everybody, Practice for Everyone in the Cross-Border Region", HUSKROUA/1701/LIP/006) is a flagship ENI CBC strategic project coordinated by Tisza EGTC. It seeks to tackle severe waste-management deficits in Zakarpattia, which have direct cross-border implications through uncontrolled dumping and river-borne pollution in the Tisza basin.

Programme materials emphasise several core components: construction of a municipal landfill and related facilities at Yanoshi (Berehove district); establishment of a regional waste-management system including selective collection and recycling; and intensive awareness-raising and behaviour-change activities in partner municipalities. The project is explicitly framed as a "complex intervention" aimed at reducing risks to water and soil quality and enabling environmentally sustainable development on both sides of the border.

News items report that 27 selective collection points are being set up in Zakarpattia, alongside the new landfill infrastructure, with strong involvement of regional and local authorities and Hungarian central actors. This infrastructure, combined with new institutional arrangements (such as regional associations for waste services), allows for a gradual transition from ad hoc dumping to a regulated and financially viable system.

Although the follow-up "ZeroWaste 2.0" initiative under Interreg NEXT is still in its early stages, it is conceived as a second-generation intervention that expands recultivation activities, equipment provision and awareness measures in the same functional area. Here, the Tisza EGTC builds on the legal, engineering and organisational groundwork of the original ENI project to deepen the circular-economy dimension and adapt to new regulatory standards under the 2021-2027 period.

In resilience terms, the ZeroWaste cluster mitigates chronic environmental stress while also generating co-benefits for health and local economies. It increases redundancy in service provision (multiple collection points and actors), reduces the likelihood of disaster-type pollution events and embeds waste management into cross-border governance routines. This reflects broader ENI/NEXT narratives that frame environmental cooperation as a way to create more cohesive and resilient border regions through long-term partnerships around shared resources (Logvinov et al., 2025).

Border efficiency and security standards: Secure Borders

Under the Interreg VI-A NEXT Hungary-Slovakia-Romania-Ukraine 2021-2027 programme, the project "Secure and Effective Borders in the Carpathian Region" (Secure Borders, HUSKROUA/23/S/3.2/018) targets institutional and procedural aspects of border management between Hungary and Ukraine. With a budget of approximately €333,000 for 2025-2026, the project is led by the International Association of Regional Development Institutions (IARDI), with Tisza EGTC as a key partner.

Programme descriptions emphasise the modernisation of border-crossing infrastructure, alignment of procedures with EU standards, and improved coordination between customs and border-guard services. The project specifically aims to reduce control times, streamline documentation and enhance information exchange, thereby contributing to the Interreg NEXT objective of "a safer and more secure Europe" and secure, efficient borders.

While the immediate outputs concern training modules, harmonised standard operating procedures and small-scale equipment upgrades, the resilience dimension lies in institutional learning and predictability. A border regime that is more transparent and aligned with EU practice is better able to cope with sudden changes, such as traffic surges, new security requirements or shifts in customs regimes linked to Ukraine's EU accession path. This corresponds to empirical findings that institutionalised cross-border routines can cushion the disruptive effects of crises on mobility and cooperation (Böhm, 2024, pp. 10-12).

For the Tisza EGTC, participation in Secure Borders strengthens its role as an intermediary between local/regional stakeholders and national border-management authorities. It extends the EGTC's portfolio from socio-economic and environmental projects to the highly sensitive field of border security, thereby broadening the range of functions through which it contributes to regional resilience.

Capacity, planning and people: LEAD-UP and PLANNING4U

Resilience in cross-border regions depends not only on physical infrastructure but also on human and institutional capacities to design and implement projects (Gabrić, 2016; Demedyuk, 2016). The LEAD-UP and PLANNING4U projects explicitly address this dimension by investing in municipal officials, planners and cross-border networks.

LEAD-UP: Building Capacity for Sustainable Futures & Cross-Border Partnerships (HUSKROUA/23/S/3.1/016) is a small-scale project under Interreg NEXT, with a total budget of €321,804 in 2025-2026. It targets 21 local communities in Ukraine, Slovakia and Hungary, providing training, mentoring and partnership-building support for cross-border infrastructure projects. According to programme descriptions, LEAD-UP aims to fill a gap in strategic planning and feasibility-study capacities at municipal level, moving beyond "soft" cooperation towards technically robust infrastructure initiatives.

From a resilience viewpoint, LEAD-UP diversifies the pool of actors capable of initiating and managing complex cross-border projects. By equipping local officials with practical project-management skills, it reduces dependence on a few expert centres and enhances the system's ability to generate adaptive responses to funding opportunities and emerging needs.

PLANNING4U (HUSKROUA/23/RS/3.1/037) complements this human-capital focus by producing joint spatial and development plans. Project news emphasise that between 2025 and 2026, the consortium – including the Research Institute for National Strategy, Szabolcs-Szatmár-Bereg County, Tisza EGTC and partners from Satu Mare and Transcarpathia – will prepare 14 micro-regional development plans in Zakarpattia and tailored strategies for three border municipalities in Satu Mare County. The project also assesses the socio-economic impacts of the war in Ukraine on the border region and addresses institutional challenges arising from administrative reform and pandemic legacies.

By creating shared evidence bases, impact studies and territorial visions, PLANNING4U strengthens the "strategic" side of resilience. It improves the capacity of border municipalities to anticipate demographic, economic and infrastructural trends, to coordinate investment decisions across the border and to position themselves within wider EU policy debates on Ukraine's reconstruction and future accession (European Parliament, 2023, pp. 43-51). Together, LEAD-UP and PLANNING4U illustrate how the Tisza EGTC functions as a resilience node not only by implementing projects but also by curating learning processes, methodologies and planning frameworks that outlive specific funding periods.

Language accessibility and economic enablement: Language APL

Finally, the Language APL project ("Cross-Border Language Accessibility in Public Life", HUSKROUA/23/S/3.1/011) addresses a less tangible but crucial dimension of resilience: communicative capacity and social cohesion in a multilingual, war-affected borderland.

According to the project brochure and Interreg NEXT project description, Language APL responds both to historical minority-language issues along the Hungarian-Ukrainian-Romanian border and to the recent influx of Ukrainian citizens into neighbouring EU regions. With a total budget of €299,352 in 2025, the project identifies best-practice multilingual locations in each partner country, provides information to minorities about their linguistic rights, supports translation of signage and materials for selected public and private actors, and culminates in a cross-border conference in Berehove presenting lessons and models.

The Antal Hodinka Linguistic Research Centre plays a central role, building on earlier empirical work showing high demand among Transcarpathian Hungarians for minority-language use in administration and services. This explicit link between research and practice aligns with broader arguments that language

rights and effective multilingual communication are preconditions for inclusive governance and conflict prevention in border regions (European Parliament, 2023, pp. 50-52).

In resilience terms, Language APL lowers informational and transaction costs for both residents and SMEs by making public services and business environments more accessible in multiple languages. This enhances the capacity of individuals and firms to navigate regulatory systems, access support schemes and engage in cross-border trade, especially under conditions of uncertainty and frequent legal change. Moreover, by visibly recognising linguistic diversity in the public space, the project contributes to trust-building and social capital, which recent literature identifies as key to the resilience of cross-border cooperation in times of crisis (Scott, 2022; Böhm, 2024).

Transferability to Slovak-Ukrainian cross-border cooperation

Similarities and differences between Tisza and SK-UA border segments

The Slovak-Ukrainian border shares several structural features with the Tisza EGTC area, but also differs in hydrology, settlement structure and institutional setting. On the Slovak side, the Prešov and Košice self-governing regions, and on the Ukrainian side Zakarpattia oblast, form the core of the borderland in both cases (Lačný – Michalková, 2025; Brenzovych, Lačný, & Tsalan, 2023). Hydrologically, however, the focus shifts from the Tisza main stem to tributaries such as the Uzh/Uh and Latorica. Studies on flood scenarios along the Uh at Lekárovce in eastern Slovakia underline high flood exposure in low-lying settlements and the need for improved structural and non-structural protection measures. At the same time, the Latorica floodplain is recognised as an ecologically valuable but hydrologically stressed landscape, where climate change and declining water levels threaten wetlands and biodiversity, prompting new transboundary restoration initiatives (Latorica, 2023; Reconnecting the Latorica river floodplain, 2023).

Socio-economically, both the Tisza and the Slovak-Ukrainian border segments are peripheral within their national territories, with below-average GDP per capita, weaker labour markets and significant out-migration. Comparative analyses show that Prešov and Košice regions, together with Zakarpattia, belong to the least performing regional economies in Slovakia and Ukraine, with structural dependence on low-value manufacturing, agriculture and cross-border commuting (Lačný & Kováčová, 2022; Lačný – Michalková, 2025). Settlement patterns are dominated by small and medium-sized towns and dispersed villages along river valleys, which makes them similar to the Tisza basin; but the Slovak-Ukrainian segment has fewer larger urban centres directly at the border, which limits market size and institutional density (Zaitseva-Chipak, 2025, pp. 199-201).

Institutionally, Slovak-Ukrainian cooperation rests on a dense treaty framework – including a 1993 treaty on good-neighbourliness, a 2000 intergovernmental agreement on cross-border cooperation and Ukraine's 2004 Law "On Cross-Border Cooperation" – and on Euroregional structures such as the Carpathian Euroregion (Melehanych & Shelemba, 2023; Duleba et al., 2019). Unlike the Hungarian-Ukrainian border, there is still no EGTC directly bridging Slovak and Ukrainian territorial authorities, despite Slovakia's high overall participation in EGTCs (15 groupings, mostly with Hungary) (Demedyuk, 2016, pp. 120-121). This creates both a gap and an opportunity: the legal and political conditions for EGTC-type cooperation exist, but an institutional vehicle similar to the Tisza EGTC has not yet been created on the Slovak-Ukrainian border.

Transferable practices and models

Given these similarities, several elements of the Tisza EGTC's practice are highly transferable to the Slovak-Ukrainian context, especially within the framework of the Interreg NEXT Hungary-Slovakia-Romania-Ukraine programme (CESCI, 2020; Interreg NEXT HUSKROUA, 2025). First, joint risk monitoring and early-warning systems for river basins – modelled on the REVITAL I approach to Solotvyno – could be adapted to the Uzh/Uh and Latorica catchments, where flood and low-water risks are already the focus of bilateral projects (Reconnecting the Latorica river floodplain, 2023). Second, the ZeroWaste model of cross-border waste-stream management and river-litter con-

trol offers a template for addressing illegal dumping and plastic pollution along Slovak-Ukrainian rivers, combining regional strategies, infrastructure and awareness-raising.

Third, harmonisation of border procedures and joint training for customs and police, as in the Secure Borders project, corresponds directly to identified needs on the Slovak-Ukrainian border, where complex Schengen rules and uneven administrative capacities remain key obstacles to mobility and trade (Lačný – Michalková, 2025). Fourth, the capacity-building model of LEAD-UP and the cross-border planning practices of PLANNING4U could be extended to Slovak partners in Prešov and Košice regions: mixed training cohorts, joint feasibility studies and shared spatial plans would strengthen local abilities to absorb EU funds and to integrate Ukrainian reform priorities into cross-border strategies (Duleba et al., 2019; European Parliament, 2023). Finally, the Language APL approach – bilingual municipal services, multilingual information tools for SMEs and explicit support for minority-language use – is directly relevant to a borderland characterised by Slovak, Ukrainian, Rusyn and Hungarian communities and by increasing post-2022 Ukrainian mobility (Zaitseva-Chipak, 2025, pp. 210-214; Lačný – Michalková, 2025).

Preconditions, limitations and risks

However, transferring the Tisza EGTC model to the Slovak-Ukrainian border is not automatic. On the legal and administrative side, Ukraine's participation in EGTCs already has a precedent through the Tisza EGTC, but any Slovak-Ukrainian grouping would still require careful alignment of Slovak EGTC legislation, Ukrainian law on cross-border cooperation and explicit central-government approvals on both sides (Demedyuk, 2016; Melehanych & Shelemba, 2023). There is also a need for clear division of competences between self-governing regions and state administrations, which earlier research has identified as a bottleneck for effective Slovak-Ukrainian cross-border action (Duleba et al., 2019).

Financial sustainability forms a second constraint. The Hungarian model of systematic core funding for EGTCs – which underpins the Tisza EGTC's resilience role – has no direct analogue in Slovakia, where EGTC participation is more reliant on project funds and member contributions (Demedyuk, 2016, pp. 120-121; CESCI, 2020). Any SK-UA EGTC would therefore need either a new national support scheme or alternative multi-annual funding (for example, ring-fenced technical assistance under Interreg NEXT) to avoid becoming a purely "project-driven" structure.

Finally, political and security risks must be considered. While Slovakia has generally supported Ukraine's EU integration and cross-border cooperation, domestic political shifts and the ongoing war introduce uncertainty about long-term priorities and public attitudes (Lačný – Michalková, 2025). Some aspects of the Tisza experience – notably the strong role of Hungarian national policy and diaspora politics – are context-specific and cannot simply be replicated in the Slovak setting. What can travel are the functional logics: basin-based risk management, integrated waste systems, capacity-building pipelines and multilingual service provision. Their institutional packaging – whether in the form of an EGTC, strengthened Euroregions or looser project-based coalitions – will have to be tailored to the evolving legal, financial and political conditions on the Slovak-Ukrainian border.

Conclusions and implications

This article asked how an institutional instrument such as an EGTC can evolve from a relatively technical implementation vehicle into a resilience node at an exposed external EU border; how, in practice, the Tisza EGTC has made this transition; and which elements of its model might be transferable to the Slovak-Ukrainian border. The analysis has shown that Tisza EGTC's trajectory is marked by a gradual but clear shift from "container for projects" to "cross-border institution" that organises monitoring, planning and service provision across multiple policy fields. Through projects such as REVITAL I, ZeroWaste, Secure Borders, LEAD-UP, PLANNING4U and Language APL, the grouping increasingly provides anticipatory capacity, redundancy and problem-solving routines that underpin environmental, infrastructural, institutional and sociocultural resilience.

Theoretically, the case underlines that resilience in cross-border governance is not a static attribute of places but an emergent property of institutional architectures. EGTCs at EU external borders can act as boundary-spanning organisations that connect cohesion, neighbourhood and enlargement logics and "harden" previously loose cooperation into durable governance nodes. Resilience here depends less on any single infrastructure or project than on the capacity of the EGTC to combine hard and soft interventions, to maintain a professional core administration and to embed joint monitoring, planning and learning practices into everyday cross-border governance.

Policy implications follow on three levels. At EU level, support schemes should explicitly recognise EGTCs with third-country members as strategic partners for resilience, for example by providing long-term technical assistance and incentivising project portfolios that integrate risk management, basic services and capacity-building. At national level, the Hungarian core-funding model points to the importance of predictable institutional support; Slovakia and Ukraine would need analogous arrangements if they were to establish a Slovak-Ukrainian EGTC capable of playing a comparable resilience role. At regional and local levels, actors should prioritise basin-based risk monitoring, integrated waste systems, border-efficiency projects, joint training and multilingual service provision when designing cross-border strategies.

The study has clear limitations. It focuses on a single case, relies mainly on documentary sources, and cannot offer a systematic outcome evaluation of the EGTC's interventions. Future research should therefore undertake comparative analyses of EGTCs at different internal and external borders, combine qualitative governance analysis with quantitative indicators of territorial change, and pay closer attention to local perceptions of how cross-border institutions affect everyday resilience.

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