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# TRILATERAL COOPERATION BETWEEN ROMANIA, MOLDOVA AND UKRAINE IN THE FIELD OF REGIONAL POLICY, INNOVATION AND EUROPEAN STUDIES: FROM THE EASTERN PARTNERSHIP TO THE THREE SEAS INITIATIVE

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**Abstract.** This study examines strategic directions for trilateral cooperation between Romania, Moldova, and Ukraine in developing a joint agenda in regional policy, innovation, and European research. The aim is to propose a model for the sustainable transformation of border regions through integration into the European Research Area and participation in macro-regional initiatives such as the Three Seas Initiative. The study draws on approaches such as the European Spatial Development Perspective (ESDP), the Eastern Partnership priorities, ESPON reports, the European Green Deal, and the EU-US Trade and Technology Council (TTC). The article also draws on contemporary research examining the concept of the "triple transition"- digital, green, and social-as a new framework for sustainable regional development. The approach employed includes political and institutional analysis, comparative regional diagnostics, and the assessment of mechanisms such as smart specialization, SME digitalization, and regional spatial information systems. Particular attention is paid to cross-border cooperation, the development of joint value chains, and institutional innovation platforms. The results point to the potential for creating joint regional innovation systems, digital clusters, and regional observatories to support data-driven policies and the internationalization of local economies. Universities are considered key actors in innovation and lifelong learning ecosystems within the framework of regional strategies. The findings are relevant for national and regional policymakers, academic institutions, and innovation actors in the Eastern Partnership countries and EU accession candidate countries. Recommendations are offered for strengthening institutional capacity, cross-border innovation networks, and knowledge-based integration. The value of this study lies in its interdisciplinary and policy-relevant contribution to the debate on regional transformation and EU integration. The article offers a practical model linking trilateral cooperation and the triple transition in the context of the changing geopolitical and economic landscape of the EU and its neighborhood.

**Keywords:** *Smart specialization, cross-border cooperation, regional innovation ecosystems, digital transition, EU integration.*

## 1. Introduction and conceptual framework

Contemporary European regional policy is undergoing significant changes, moving away from nationally-centered governance models and toward multi-level and post-national approaches to spatial organization. In the context of the cross-border regions of Romania, Moldova, and Ukraine, this means not only a rethinking of borders but also the implementation of new models of coordination and integration within the Eastern Partnership and the Three Seas Initiative (3SI). Territory is no longer simply a fixed administrative unit and is being viewed as a dynamic socio-spatial construct shaped by economic, cultural, institutional, and political interactions. This process is consistent with the "European Spatial Development Perspective."[1]

The post-national logic of territorial organization is manifested in the gradual transformation of the roles of the state, regional authorities, and local communities. Rigid vertical hierarchies are giving way to a flexible, multi-level system emphasizing networked forms of interaction. In this context, Euroregions, cross-border clusters, and macro-regional platforms, which ensure coordination

between countries and regions, are particularly important. For Romania, Moldova, and Ukraine, participation in such initiatives offers opportunities to overcome historical barriers, integrate into European economic chains, and strengthen cross-border cooperation. Within the EU, examples of post-national logic are Euroregions and macro-regions, created based on shared interests and challenges rather than national sovereignty. The post-national approach also implies a significant expansion of the role of universities and research institutes in regional policymaking. They act not only as educational institutions but also as innovation hubs, bringing together business, civil society, and government agencies. Universities play a critical role in the development of cross-border clusters, knowledge exchange, and the training of specialists capable of working in an integrated knowledge economy. An analysis of the current context shows that trilateral cooperation between Romania, Moldova, and Ukraine can serve as a platform for the sustainable transformation of border regions. Synergies between local initiatives, macro-regional strategies (e.g., 3SI), and European priorities (ESDP, EU Green Deal, EU-US TTC) create the conditions for the development of innovative, digital, and environmentally sustainable regional ecosystems. Thus, the conceptual framework of the study includes three interrelated elements:

1. Post-national approach and multi-level territorial coordination– flexible management system, integration of local and macro-regional initiatives.
2. Smart Specialization and triple transition– leveraging regional advantages, digital and green transformation, social innovation.
3. The role of universities and academic centers– development of innovative ecosystems and platforms for cross-border cooperation.

Together, these elements create an analytical and regulatory framework for the development of sustainable strategies for the transformation of border regions, allowing:

- identify the potential and weaknesses of territories;
- to form transregional clusters and initiatives;
- integrate local projects with macro-European strategies;
- support a sustainable economy based on knowledge, innovation and digital technologies.

One of the key concepts of modern regional policy is Smart Specialisation (S3/S4). In the context of the triple transition, which includes digital transformation, the green economy, and social innovation, Smart Specialisation strategies require not only identifying the competitive advantages of individual regions but also aligning priorities between them to create transregional synergies. For example, digitalisation of the economy and the implementation of sustainable technologies in the border regions of Ukraine, Moldova, and Romania are becoming possible through joint projects, the coordination of universities and science and technology parks, and the use of EU programmes such as Horizon Europe, INTERREG, and Cohesion Funds.

**2. Euroregions and macroregions: structure, functions and examples**

In today's cross-border regions of Eastern Europe, Euroregions and macro-regional strategies are becoming key instruments for coordinating and integrating local communities. For the border regions of Romania, Moldova, and Ukraine, these forms of cooperation represent more than just administrative units; they are platforms for strategic and practical coordination, facilitating sustainable development, knowledge exchange, and integration into European initiatives.

In the current context of sustainable development and European integration, concepts linking spatial transformation [2], innovation, and digital transformation with social justice and ecological balance are becoming key. One such integrative approach is the concept of triple transition, which expands on the traditional dual idea of "green + digital" [3] transition by introducing a mandatory social element. The OECD report, “Towards a Triple Transition: Strategies for Transformational European Development Action” [4], highlights that in an era of multiple crises - the pandemic, climate change, and geopolitical upheaval - the European Union continues to update its instruments and tools, including in response to events such as the COVID-19 pandemic and Russia’s invasion of Ukraine, which have highlighted the need for broader and more effective use of existing resources, as well as closer coordination and joint action.

*2.1. Euroregions: Local Cross-Border Platforms*

Euroregions are organizations created to promote cooperation between neighboring regions of two or more countries. They do not have legislative power, but serve as coordinating and project-managing bodies capable of initiating joint economic, social, and cultural projects. Unlike national governments, Euroregions operate on a bottom-up strategy, stimulating the participation of local authorities, civil society, and businesses. Key characteristics of Euroregions:

- Lack of direct political power;
- Limited competence agreed upon by the participants;
- Focus on the common good, integration and joint problem solving;
- Funding through EU programmes such as INTERREG and European Territorial Cooperation (ETC) [5], as an analysis of the institutional maping [6] of cross-border cooperation based on KEEP data has shown, INTERREG programmes play a key role in the creation and sustainability of Euroregions.

For the region of Romania, Moldova and Ukraine, examples of Euroregions could be:

- Euroregion Dniester – unites the border territories of Ukraine and Moldova, focused on joint projects on water resources, ecology and economic integration.
- Euroregion Lower Danube – includes the territories of Romania and Moldova, focusing on transport infrastructure and economic initiatives.
- Euroregion Siret-Prut-Nistru– coordination of cultural, educational and tourism projects, strengthening cross-border social integration.
- Euroregion Prut Upper [7]

Through Euroregions, joint cluster initiatives can be organized to address digitalization, green energy, and the development of small and medium-sized enterprises (SMEs), which is fully consistent with the triple transition concept. In particular, the participation of universities and research centers in these structures enables the formation of cross-border innovation networks that connect educational, research, and entrepreneurial resources.

*2.2. Macro-regions: EU strategic platforms*

Macroregions represent larger geopolitical and strategic spaces uniting several countries and regions facing common challenges and sharing resources. They ensure coordination at the policy and strategic planning level without the creation of new institutions or additional funding.

Examples of EU macro-regional strategies:

- Baltic macroregion– strategic management of transport, energy and digital infrastructure;
- Danube macro-region (EUSDR)– integration of territories through sustainable energy, logistics and science projects;
- Adriatic-Ionian macroregion– support of tourism, transport and maritime economy;
- Alpine macroregion- environmental planning and sustainable development.

Principles of the macro-regional strategy:

1. No creation of new institutions;
2. No new sources of funding;
3. There are no changes to existing legislation.

For Romania, Moldova, and Ukraine, the potential for macro-regional coordination is evident in their integration into the Three Seas Initiative (3SI) [8] and the European Union for Strategy of Danube Region (EUSDR), which provide frameworks for cross-border cooperation in energy, transport, digitalization, and the knowledge economy. These platforms allow for the linking of local Euroregion projects with macro-European strategic priorities, creating a single, integrated planning horizon. Thus, macro-regions represent the EU's political and strategic platforms, ensuring policy coherence and coordination across a wider area, while Euroregions operate at the local level, stimulating direct interaction between neighboring communities.

*2.3. Complementarity of Euroregions and macroregions*

Euroregions and macroregions [9] represent complementary levels of territorial cooperation, where the former facilitate practical interaction between neighboring local communities, while the latter form a strategic framework across a broader geopolitical space. Euroregions focus on specific

cross-border issues - infrastructure, economics, and education - while macroregions harmonize regional policies and create conditions for scaling up local initiatives. In the context of cooperation between Romania, Moldova, and Ukraine, this two-tier model allows for the integration of operational projects in border areas with long-term goals of European integration and sustainable development. This combination enhances the impact of local initiatives by linking them with EU macroregional strategies.

**Table 1. Comparative analysis of Euroregions and macroregions**

| Criterion | Euroregion | Macroregion |
|---|---|---|
| Scale | Local, border | Supranational, large |
| Participants | Border regions | Regions/countries of the entire macroregion |
| Form | Flexible association, often informal or EGTC | Political and strategic platform of the EU |
| Target | Strengthening local cross-border cooperation | Strategic Management of Common Challenges |
| Examples | Carpathians, Neisa, Dniester | Strategies of the Danube, Baltic and Alps, Adriatic-Ionian |

*Source: Compiled by the authors*

This framework emphasizes the interdependence of Euroregions and macroregions: Euroregions foster direct interaction between neighboring communities, while macroregions ensure strategic coherence and link local initiatives to EU priorities. Together, they form a complementary, multi-level model of territorial governance [10], linking local initiatives to macro-European strategic goals. Euroregions create conditions for direct interaction between neighboring communities, stimulating bottom-up social and economic integration. Macroregional strategies link these local initiatives to EU policy, ensuring strategic coherence and the ability to scale up projects. In the context of trilateral cooperation between Romania, Moldova, and Ukraine, this combination allows for:

- organize cross-border innovation clusters;
- coordinate the development of transport and energy infrastructure;
- create joint programs for digitalization and green economy;
- strengthen institutional readiness and knowledge sharing through universities and research centres.

*2.4 Integration with the Triple Transition [11] and Smart Specialisation Concepts*

Euroregions and macroregions serve as platforms for the implementation of Smart Specialisation [12] (S3/S4), enabling regions to identify their competitive advantages and pool their efforts to develop cross-border projects. For the EU's Eastern Borderlands, including Romania, Moldova, and Ukraine, the key areas are:

- digitalization of the economy and open data management;
- development of sustainable energy and green infrastructure;
- stimulation of social innovative entrepreneurship and integration of citizens.

The integration of local Euroregions with macro-regional strategies allows for the combination of bottom-up initiatives with top-down EU coordination, creating a multi-level platform capable of sustainably transforming border areas.

**3. The role of universities and the academic environment in the transformation of border regions**

Universities and academic institutions play a critical role in the sustainable transformation of the border regions of Romania, Moldova, and Ukraine. They act not only as educational and research centers but also as active agents of regional development, integrating economic, social, and environmental initiatives. Their contribution is particularly noticeable in the context of the implementation of Smart Specialization (S3/S4[13]) and the triple transition concept, which encompasses digital transformation, the green economy, and social innovation.

*3.1. Universities as centers of knowledge and innovation*

For the cross-border regions of Eastern Europe, a key aspect is the creation of joint educational and research platforms that bring together universities, science and technology parks, and enterprises. Such platforms allow

- to form cross-border knowledge clusters;
- ensure training of specialists in the field of digital technologies and sustainable economy;
- create conditions for innovative entrepreneurship, including spin-out companies and start-ups.

Examples of successful integration of universities into trilateral initiatives:

1. University of Craiova (Romania)[14] – participation in digitalization, eco-mobility and sustainable transport projects within the Interreg and Horizon Europe programs.

2. Charles University, Prague (Czech Republic) [15] – although not directly involved in the trilateral cooperation, serves as an example of university integration into macro-regional networks through research in the fields of climate technology, digital security, and medicine.

3. The University of Ljubljana (Slovenia) [16] is a coordinator of cross-border sustainable energy clusters and a member of the 3SI University Network, demonstrating the potential for academic integration at the macro-regional level.

4. The University of Trieste (Italy) [17] and AREA Science Park [18] are examples of successful collaboration between a university and a science and technology park, including projects in marine science, biomedicine, and sustainable logistics.

*3.2. The Academic Environment as a Catalyst for Digital and Green Transformation*

Border regions often face uneven development in infrastructure, technology, and human capital. Universities help overcome these disparities by:

- digital transformation: creation of laboratories, hackathons, and programs to improve digital literacy;
- environmental sustainability: research projects on renewable energy, water resources and sustainable logistics;
- social innovation: programs for citizen engagement and stimulation of entrepreneurial activity among young people.

Institutional support for universities also contributes to the implementation of European strategies: the EU Green Deal [19], Cohesion Funds, RIS3/S4, making educational institutions important participants in cross-border projects compatible with EU priorities.

*3.3. Interaction with macro-regional initiatives*

Universities are becoming a link between local Euroregions initiatives and macro-regional platforms such as EUSDR or 3SI. Their participation allows

- to form cross-border research networks;
- create regional observatories and open data platforms to support decision-making based on analysis;
- implement innovative value chains through joint research projects and academic clusters.

For example, within the Dniester Euroregion, universities from Ukraine and Moldova collaborate on projects on water resource management and green energy. Similar initiatives are being implemented through the Three Seas University Network [20], where universities from Romania, Moldova, and neighboring countries exchange experiences in digitalization, transport integration, and sustainable energy.

*3.4. The main functions of universities in the transformation of the region*

1. Stimulating innovative entrepreneurship: creation of incubators, technology parks, spin-out companies; development of cross-border clusters and startup communities.

2. Development of human capital and skills: advanced training programs, internships and student exchange; training of personnel for the digital and green economy.

3. Social integration and community support: volunteer initiatives, involving citizens in research projects; cultural and educational programs to strengthen cross-border cooperation.

4. Increasing regional innovation activity: consulting services for business; innovation vouchers and science and technology parks; development of joint laboratories and research centers.

*3.5. Universities as a driver of trilateral cooperation*

The unification of academic resources from Romania, Moldova and Ukraine allows:

- integrate local initiatives with macro-regional and European strategies;
- to form sustainable ecosystems of knowledge and innovation;
- increase the competitiveness of border regions and attract investment;
- to ensure training of personnel for the knowledge economy, focused on digitalization and sustainable development.

**4. Action Plan: From Diagnostics to Transformation of Border Regions**

The transformation of the border regions of Romania, Moldova, and Ukraine requires a systemic approach that combines local initiatives, macro-regional strategies, and the active participation of academic institutions. The action plan is based on the Smart Specialization (S3/S4[21]) concept, the triple transition principles (digitization, green economy, social innovation), and a multi-level approach to regional development. It envisions the gradual engagement of all stakeholders—universities, local authorities, businesses, and civil society-in the joint creation of sustainable cross-border ecosystems.

*4.1. Regional diagnostics (0–1 year)*

The first stage is aimed at a comprehensive analysis of the current state of border territories. Goals: identifying strengths and weaknesses, opportunities and risks, and determining the potential for cross-border initiatives. Key activities:

- Data collection and resource mapping: using Border Regions Data Hub[22], RHOMOLO[23], BAK S3 tools[24], analysis of economic, social and environmental infrastructure.
- Assessment of innovation potential: identification of research centers, universities, technology parks, start-ups and clusters.
- Analysis of Euroregions and macro-regional initiatives: identification of existing projects and bottlenecks in coordination between Romania, Moldova and Ukraine.
- Participants: universities, research institutes, regional development agencies, municipalities.

*4.2. Formation of cross-border clusters (1–2 years)*

At this stage, platforms are being created for collaboration between universities, businesses, and local authorities. The main goal is to form cross-border innovation clusters integrated with Euroregions and macroregional initiatives. Activities:

- Creation of transnational clusters in the areas of digital economy, green energy and sustainable transport;
- Development of joint educational programs and laboratories;
- Involvement of small and medium enterprises (SMEs) for integration into value chains.

Examples:

- The Universities of Craiova, Chernivtsi and Chisinau are forming joint clusters on renewable energy and digital transformation;
- Use of SI University Network platforms to share experiences, resources and research data;
- Euroregions Dniester and Siret-Prut-Nistru become coordinators of practical initiatives at the local level.

*4.3. Launching pilot projects (2–3 years)*

At this stage, specific cross-border projects are implemented, serving as a test for the long-term strategy. Pilot initiatives include:

- Digitalization of regional infrastructure: creation of open data portals, digital resource maps, smart laboratories;
- Green economy and sustainable development: implementation of renewable energy sources, sustainable logistics and joint environmental projects;
- Social innovation and entrepreneurship: educational and entrepreneurial programs for youth, volunteer initiatives.
- Participants: consortia of universities, businesses and local authorities, Euroregions, Interreg and Horizon Europe programmes. Pilot projects should consider collaboration with the EU–US Trade and Technology Council (TTC)[25], leveraging the expertise and resources available through US

initiatives. These projects could include joint laboratories, digital platforms, and research initiatives based on standards and practices developed within the TTC.

*4.4 Monitoring, evaluation and scaling up (3–5 years)*

Following the implementation of pilot projects, the next step is to evaluate effectiveness and scale up successful practices. Key actions:

- Monitoring KPIs and sustainable development indicators: digitalization, innovation level, business and citizen engagement;
- Data analysis and strategy adjustment: use of BAK S3, RHOMOLO, Entrepreneurial Discovery Process methodology for informed decision-making;
- Scaling up successful projects: disseminating best practices to other border regions and integrating them into macro-regional strategies.
- Participants: national and regional authorities, universities, the European Commission, development agencies.

*4.5. Basic principles of strategy implementation*

1. Multi-level coordination: linking local Euroregions with macro-regional platforms and EU strategies; creating working groups for regular coordination between universities, businesses, and government agencies.
2. Active participation of universities: universities become centers of knowledge, innovation and training; creation of cross-border laboratories and research networks.
3. Integration of triple transition principles: digitalization, green economy, and social innovation become the foundation of all projects; the Horizon Europe and EU Green Deal programs are used to attract funding and expertise.
4. Transnational partnership, transparency and stakeholder engagement: regular consultations with local communities; use of open data platforms and public observatories for information sharing. Using the EU-US Trade and Technology Council (TTC) platform to integrate cross-border innovation clusters with global technology ecosystems.
5. Support for cross-sector cooperation and pilot initiatives: universities, businesses, and government agencies collaborate to create start-ups, innovation clusters, and research projects; euroregions provide local coordination, while macroregions provide strategic support.

**5. Conclusion and recommendations**

An analysis of Euroregions, macroregions, and the role of universities in the border regions of Romania, Moldova, and Ukraine suggests the need for a comprehensive approach to territorial transformation. The synthesis of the concepts of Smart Specialization (S3/S4), Triple Transition, and a post-national approach to spatial organization demonstrates that sustainable development is only possible with the active participation of all key actors - government agencies, local communities, universities, and businesses. Trilateral cooperation is becoming a unique platform for integrating local and macro-European initiatives, stimulating innovation, and strengthening the social capital of border regions.

*5.1. Key findings*

1. Euroregions and macroregions are complementary instruments: euroregions ensure direct interaction at the local level, stimulating cooperation between border communities, knowledge exchange, and pilot projects; macroregional platforms, such as the Three Seas Initiative (3SI) and EUSDR, ensure strategic coordination, policy alignment, and the integration of local initiatives into European strategies.
2. Universities play a central role in regional transformation: academic institutions form innovation clusters, provide qualified personnel training, and create cross-border research networks; the integration of universities into Euroregions and macroregional initiatives enables the transformation of knowledge into practical projects that promote digitalization, sustainable energy, and social innovation.
3. Triple transition as a framework for sustainable development: digitalization, green economy, and social innovation are becoming key guidelines in the formation of cross-border

strategies; the application of the Smart Specialization concept allows regions to identify their competitive advantages, synchronize efforts, and create joint innovation chains.

4. The need for a multi-level approach: territorial transformation requires the coordination of actions at the local, national and macro-regional levels, integration into European initiatives and the creation of sustainable cooperation networks between all stakeholders.

5. The practical effect of trilateral cooperation: joint projects between universities, businesses, and government agencies strengthen social capital, increase regional competitiveness, promote international integration, and foster the development of sustainable innovation ecosystems.

*5.2. Recommendations for the implementation of a sustainable transformation strategy*

1. Development of a joint institutional architecture
2. Strengthening the university and academic component
3. Creation of unified cross-border strategies
4. System monitoring and stakeholder participation
5. Promoting intersectoral cooperation and pilot projects

*5.3. Key Elements of Success*

1. Strategic management – coordination of local, national and macro-regional initiatives.
2. University leadership in innovation – knowledge centers and laboratories become drivers of transformation.
3. Participation of all stakeholders – involvement of business, civil society and government authorities.
4. Integration with European priorities – compliance with RIS3/S4, EU Green Deal and 3SI increases the efficiency and sustainability of projects.

**Conclusion**

The implementation of trilateral cooperation between Romania, Moldova, and Ukraine, based on the integration of Euroregions, macroregions, and university resources, enables border regions to develop as innovation-driven, sustainable, and competitive territories. Supporting local initiatives through strategic planning, university participation, and coordination with macroregional platforms creates a long-term and scalable transformation model that facilitates EU integration, digital and green modernization, and the strengthening of social capital in border communities.

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