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Lima, Peru. October 13–17, 2025

The Impact of the War in Ukraine on Regional Disparities and Resilience in Central Europe: A Case Study of Poland

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Outline of the presentation

From Global Crises to Regional Resilience

- 1. Context:** Overlapping shocks: climate changes, financial crisis, pandemic, war in Ukraine
- 2. Research Framework:** TWO NSC- funded projects: TIPERICO & RECORU; shared analytical lens: Resilience
- 3. Empirical Focus:** spatial disparities, local adaptation, mapping resilience
- 4. Expected insights:** uneven resilience and adaptive capacities of peripheries, policy shift (from compensation to transformation, towards post-2027 cohesion policy)







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PROJECT OPUS 19 -2020/37/B/HS4/01034



The Trajectories and Challenges of the development of inner peripheries in the new conditions of cohesion post SARS-CoV-2

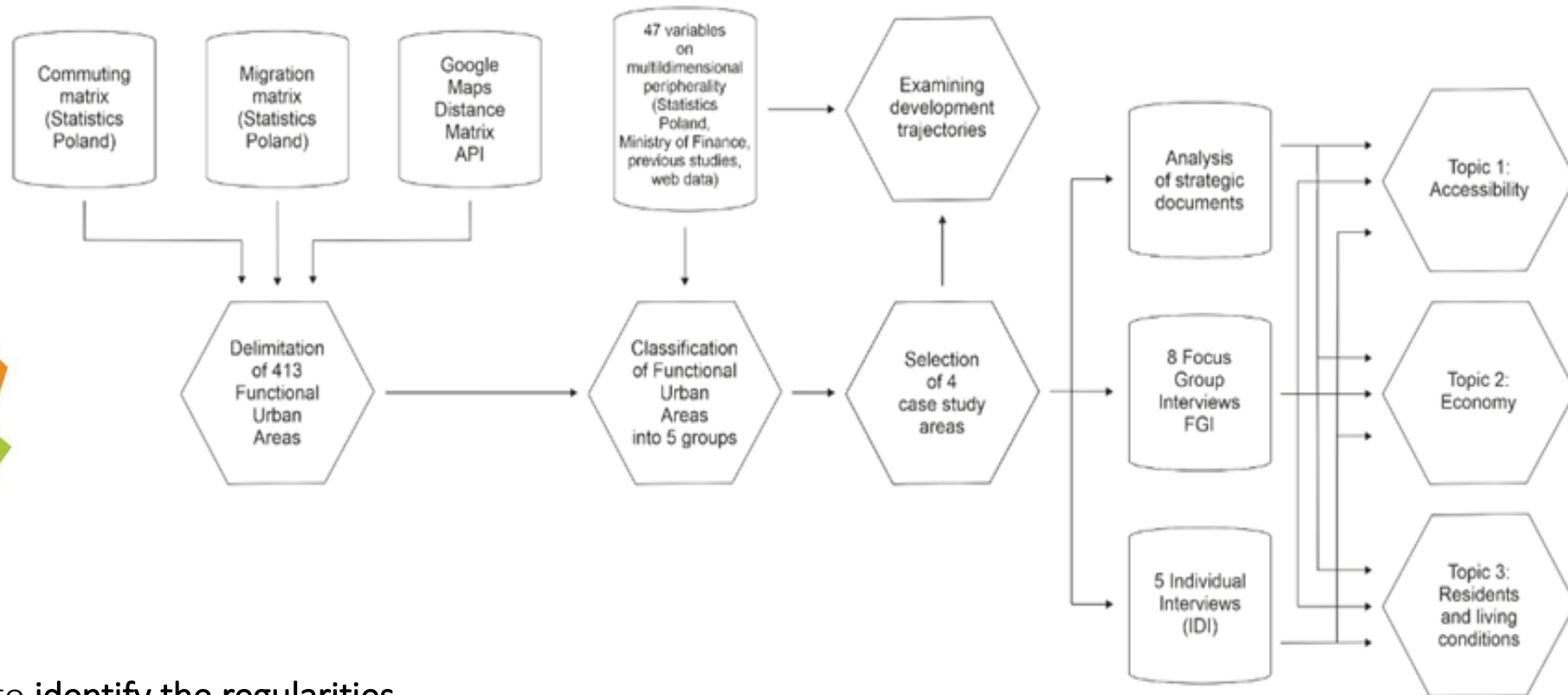
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TIPERICO project



The objective of the project was to **identify the regularities of changes to the socio-economic development in selected inner peripheries in Poland** with special attention given to their sensitivity and resilience to the consequences of the **SARS-CoV-2 crisis**, and the resulting recommendations for the changes in the development policy interventions.

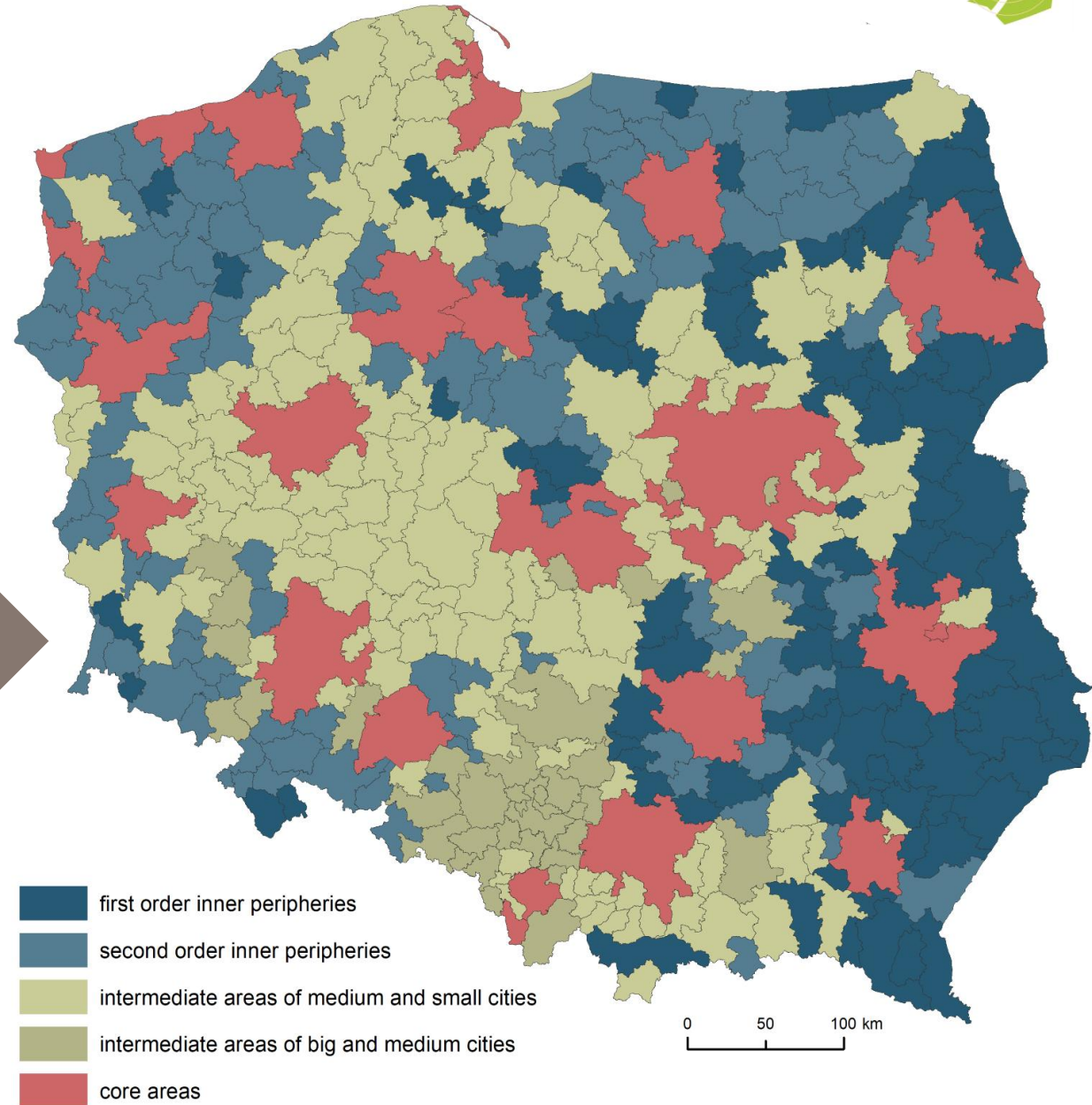
The application-related goal of the project refers to recommendations on the **direction and ways of making developmental intervention (including the choice of instruments)** in inner peripheries in Poland with special emphasis placed on the importance of the local cities to creating conditions for networking and diffusion of developmental processes.

Identifying Inner Peripheries in Poland



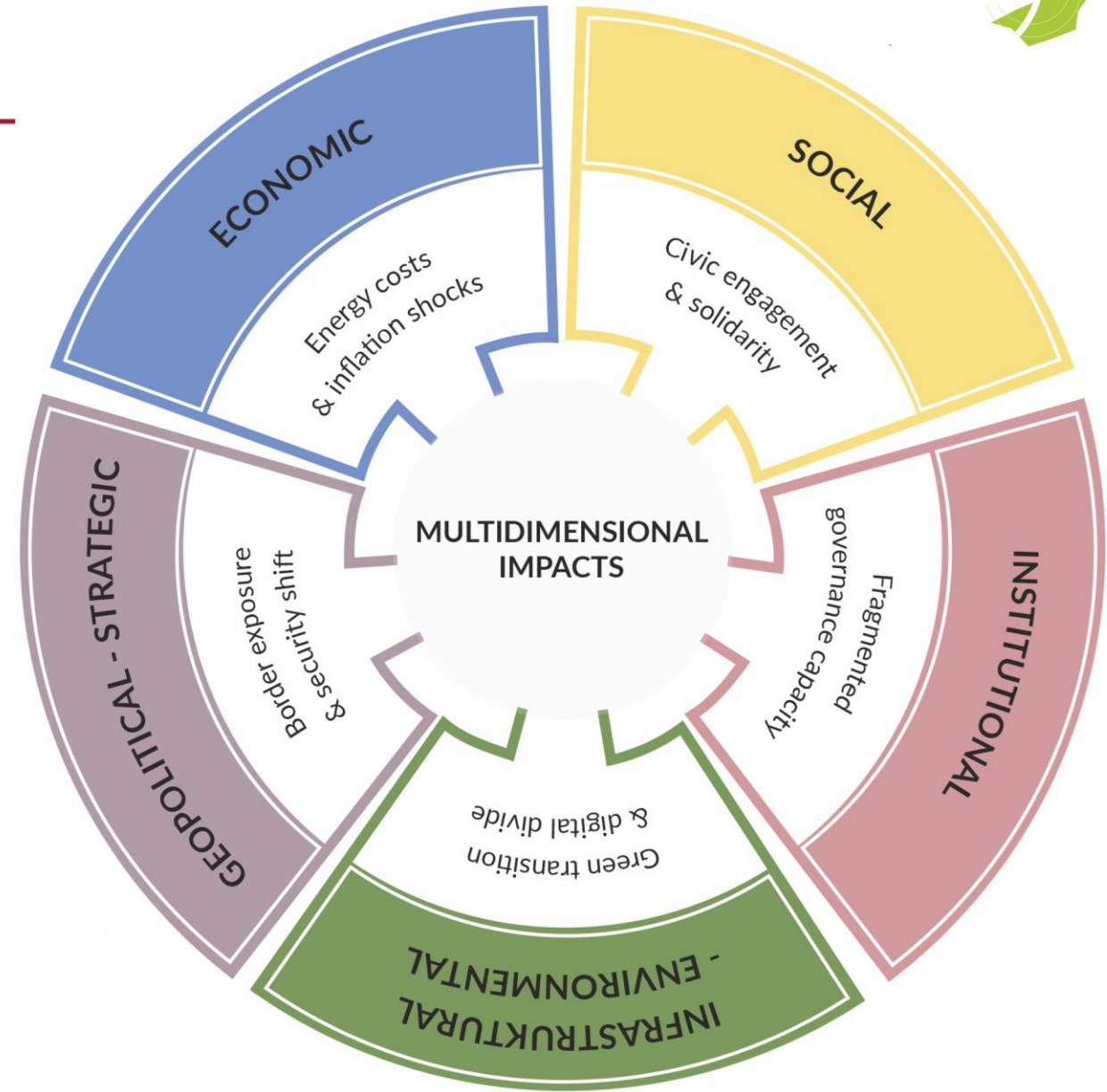
Delimitation of 413 functional urban areas (FUAs)

Classification based on 47 indicators of 6 factors of territorial capital (accessibility, human capital, social and institutional capital, financial capital and material capital)



War-Induced Vulnerabilities in Polish Inner Peripheries

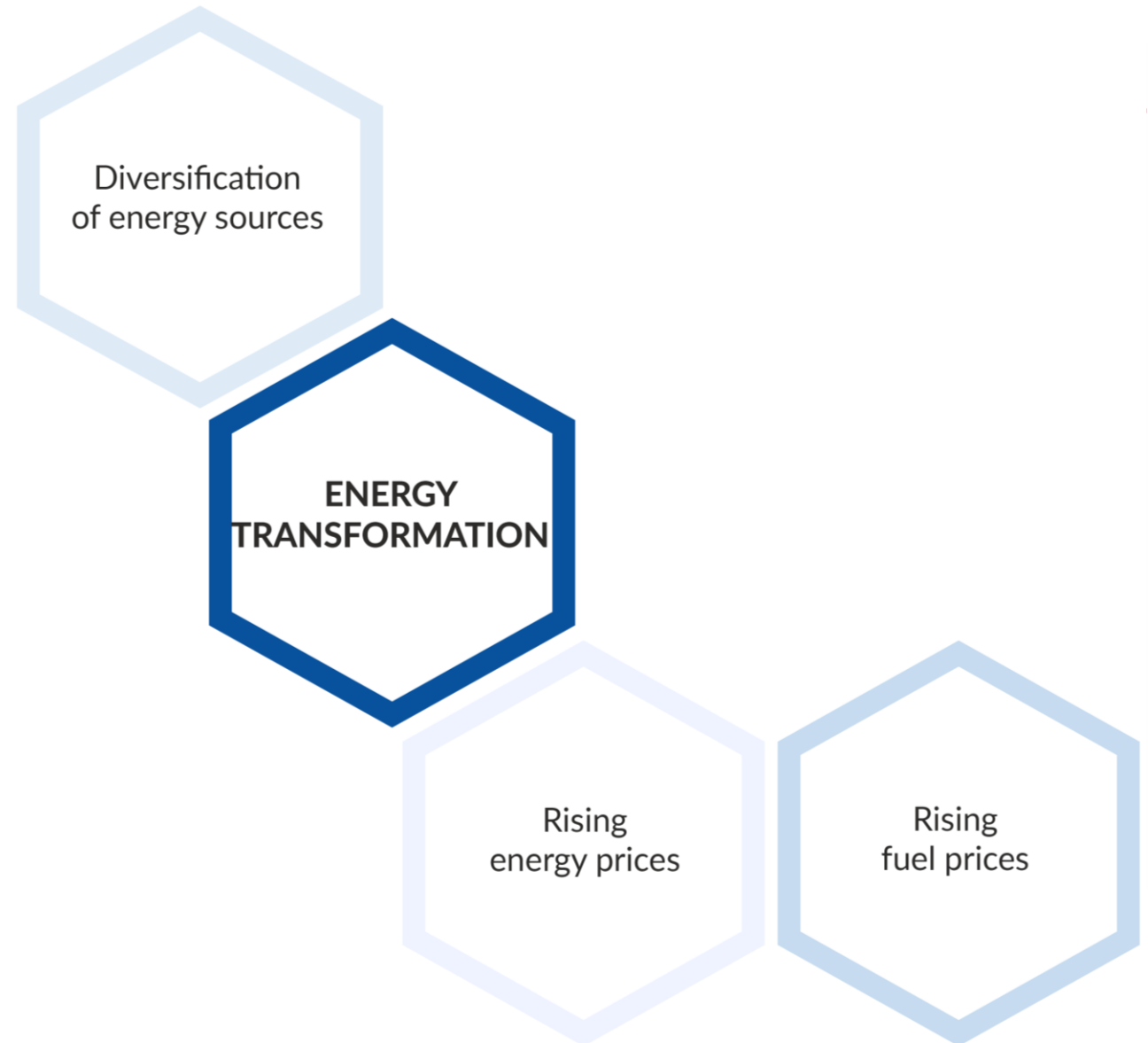
- Exposed multi-layered vulnerabilities in inner peripheries
- Reinforced importance of institutional and social resilience
- Accelerated energy and demographic transitions
- Triggered new adaptive responses at local level



Energy transformation

The war-induced **energy crisis** accelerated the local turn toward renewables. In inner peripheries, municipal projects focused on energy autonomy — small solar installations, biogas plants, and heating cooperatives — emerged as a resilience mechanism.

However, structural limitations in financing and grid access still constrain transformative potential.



Labour market & Education



Labour migration and reallocation intensified, with local labour markets facing dual pressure — **outmigration of residents** and **inflow of refugees**.

Educational systems, especially vocational schools, became key adaptive actors, integrating new groups and updating skills toward logistics, construction, and energy sectors.



Community integration



War proximity triggered waves of **civic engagement and volunteerism** yet also revealed governance gaps. Local NGOs and informal networks filled institutional voids, reinforcing community-based resilience that compensates for limited state capacity.

These networks evolved from spontaneous solidarity into more structured local partnerships, shaping a new layer of social resilience crucial for peripheral regions.



From Pandemic Resilience to War-Induced Transformation



The findings from the **TIPERICO project** — originally focused on the socio-economic consequences of the **COVID-19 pandemic** — revealed deeper, structural vulnerabilities of Poland's inner peripheries.

When the **war in Ukraine** erupted, these territories once again found themselves on the frontline of overlapping crises.

The new context expanded our analytical horizon — from **pandemic-induced disruptions to compound shocks combining economic, social, and geopolitical dimensions.**

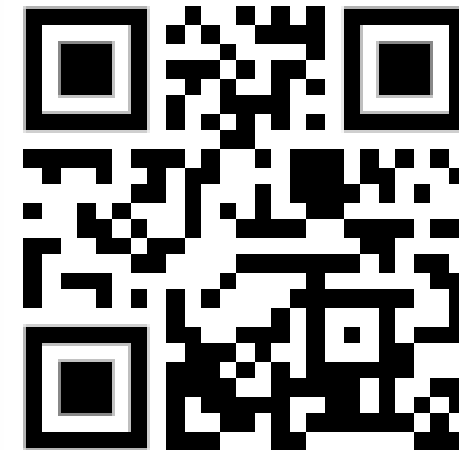


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PROJECT OPUS 25 -2023/49/B/HS5/00256



NEW RESEARCH PROJECT



*Regional policy in Europe under conditions of development shocks
– challenges of regional development resulting from the socio-economic
consequences of Russia's aggression against Ukraine*

Cooperation:

- University of Eastern Finland, Joensuu
- Leibniz Institute for Regional Development and Structural Planning (ISR), Erkner;
- Bucharest University of Economics Studies, Bucharest

Budget: 1 097 024 PLN
Duration: 2024 - 2028

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Our objectives

Main objective: Identification of spatial differences in selected social and economic consequences of Russia's aggression against Ukraine, and explanation of their impact on the transformation of regional development processes and the evolution of regional policy in EU countries and regions.

Research:

- Theoretical basis of regional development under shocks
- Socio-economic impacts of war on EU regions
- Stakeholder views on war impacts and responses

Methodological:

- Conceptual model of spatial war impacts
- Spatial modelling of war consequences in the EU
- Regional resilience and adaptation to war impacts

Applicative:

- Policy recommendations to enhance regional recoverability from war-induced shocks

Conceptual Approaches to Regional Resilience

- **Engineering resilience:**

Focuses on a rapid return to a pre-shock equilibrium. Quantifiable via economic indicators (e.g. GDP, employment). Suitable for short-term shocks. (Martin 2018; Holling 1996)

- **Ecological resilience:**

Allows for path shifts between multiple equilibria. Emphasizes system stability and absorption capacity until collapse threshold. Applies to severe disruptions. (Capello et al. 2015)

Equilibrium approach

- **Evolutionary Resilience**

Views resilience as a path-dependent process of adaptive reconfiguration and creative destruction. Emphasizes learning, actors, and institutional change. (Boschma 2015; Bristow & Healy 2018)

- **Transformative Resilience**

Involves fundamental systemic transition to a new development trajectory when existing structures become dysfunctional. Linked to MLP and just transition. (Sutton et al. 2023; Geels & Schot 2007)

Evolutionary approach



4 dimensions of Regional Economic Resilience

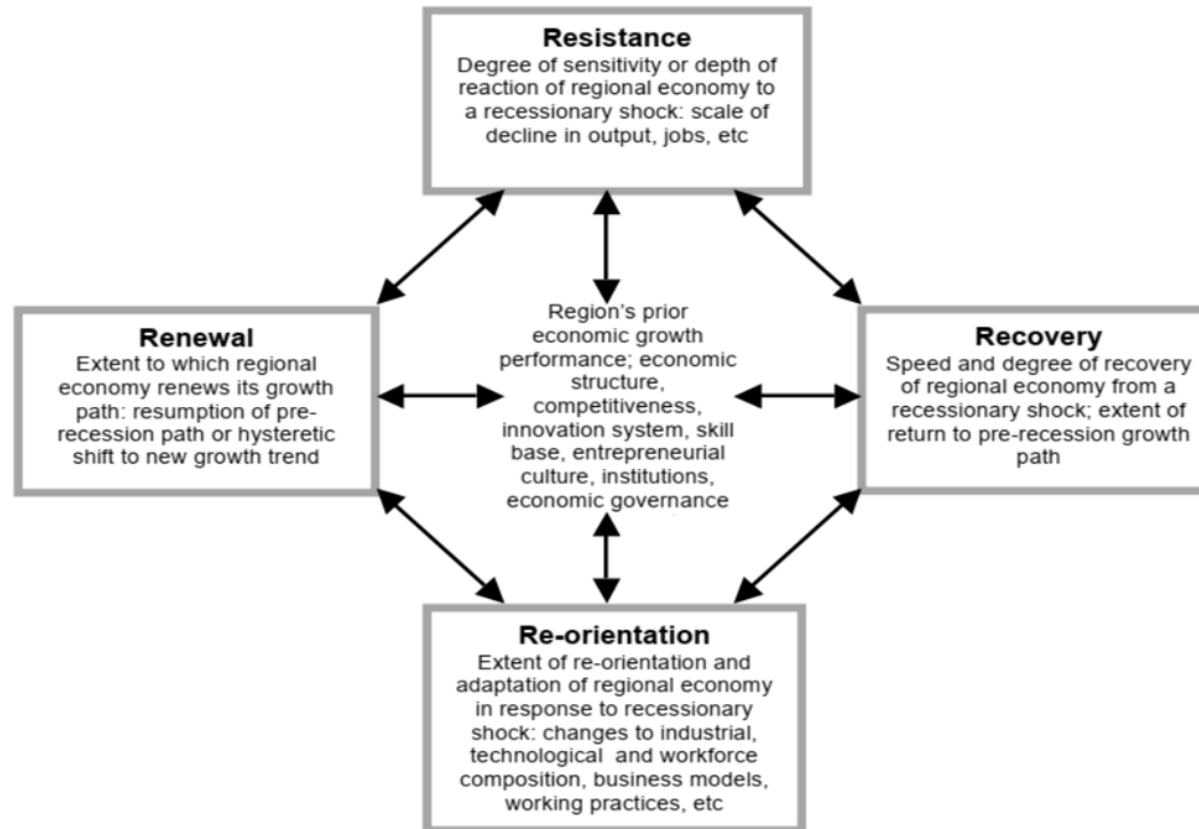
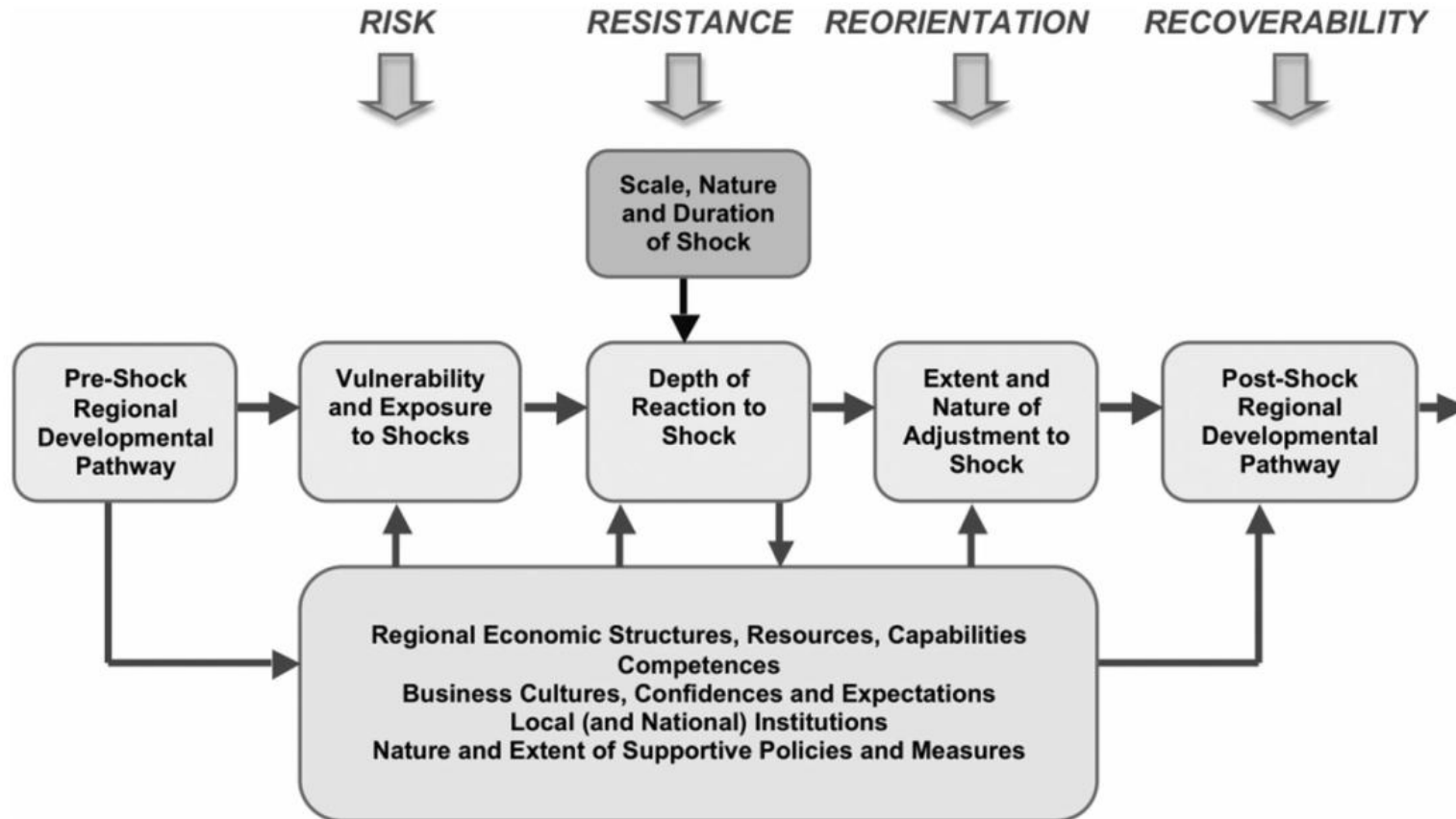


Figure 4: Four Dimensions of Regional Economic Resilience to Recessionary Shock

Source: Martin (2012, s.16)



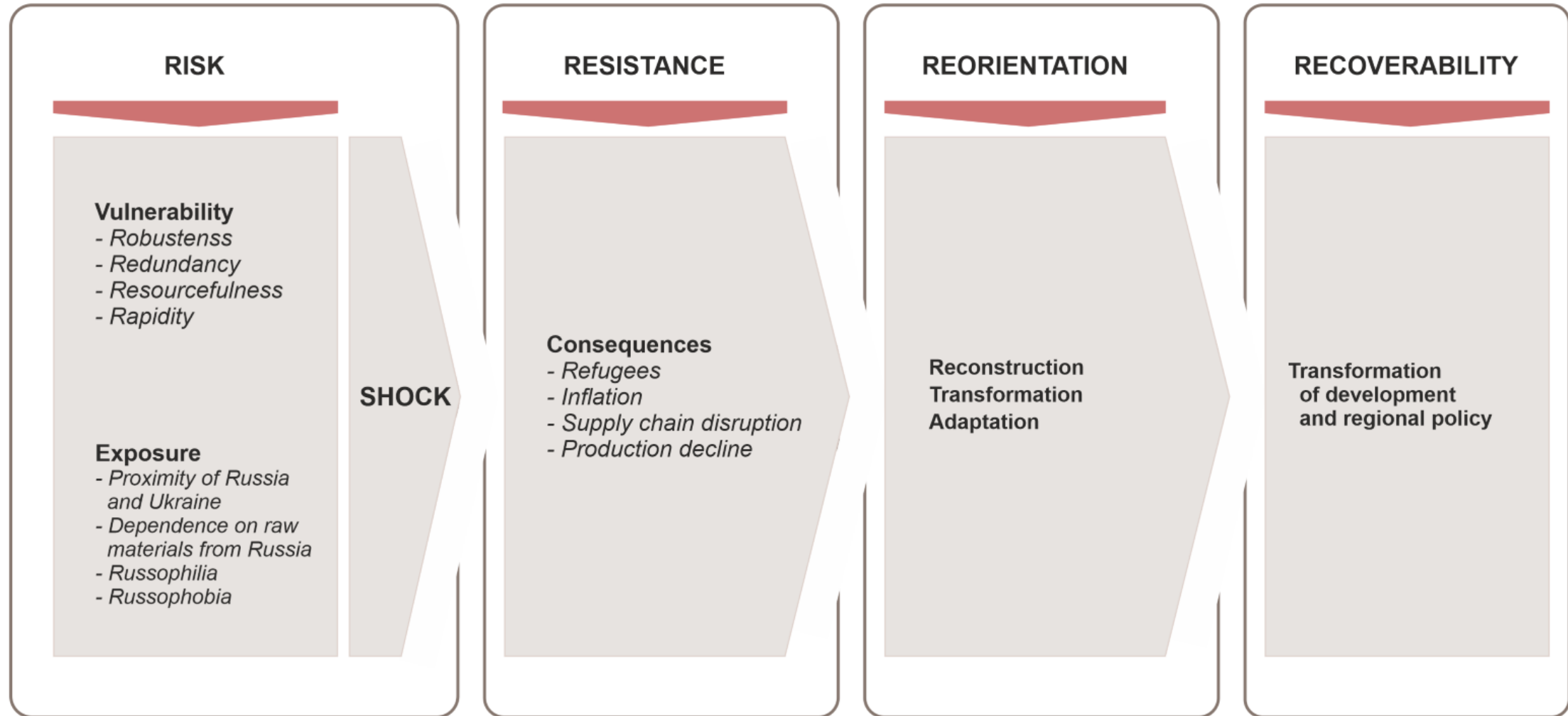
Regional Resilience to Recessions



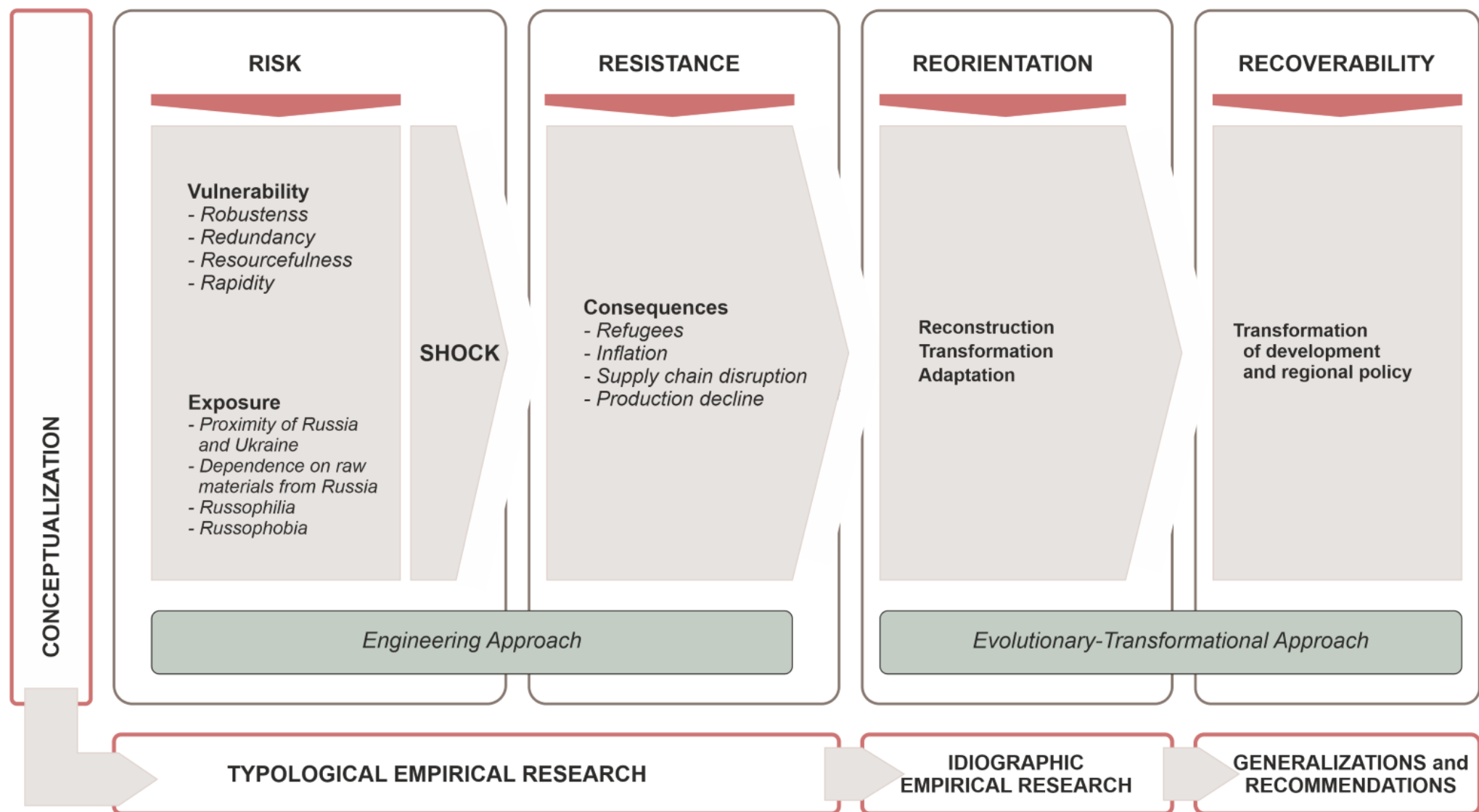
Source: Martin, R., Sunley, P., Gardiner, B., & Tyler, P. (2016). How regions react to recessions: Resilience and the role of economic structure. *Regional Studies*, 50(4), 561-585. p. 565. Permission from the publisher of the Journal.



Our adaptation of the resilience concept for research



Linking Resilience concept with Research Plan

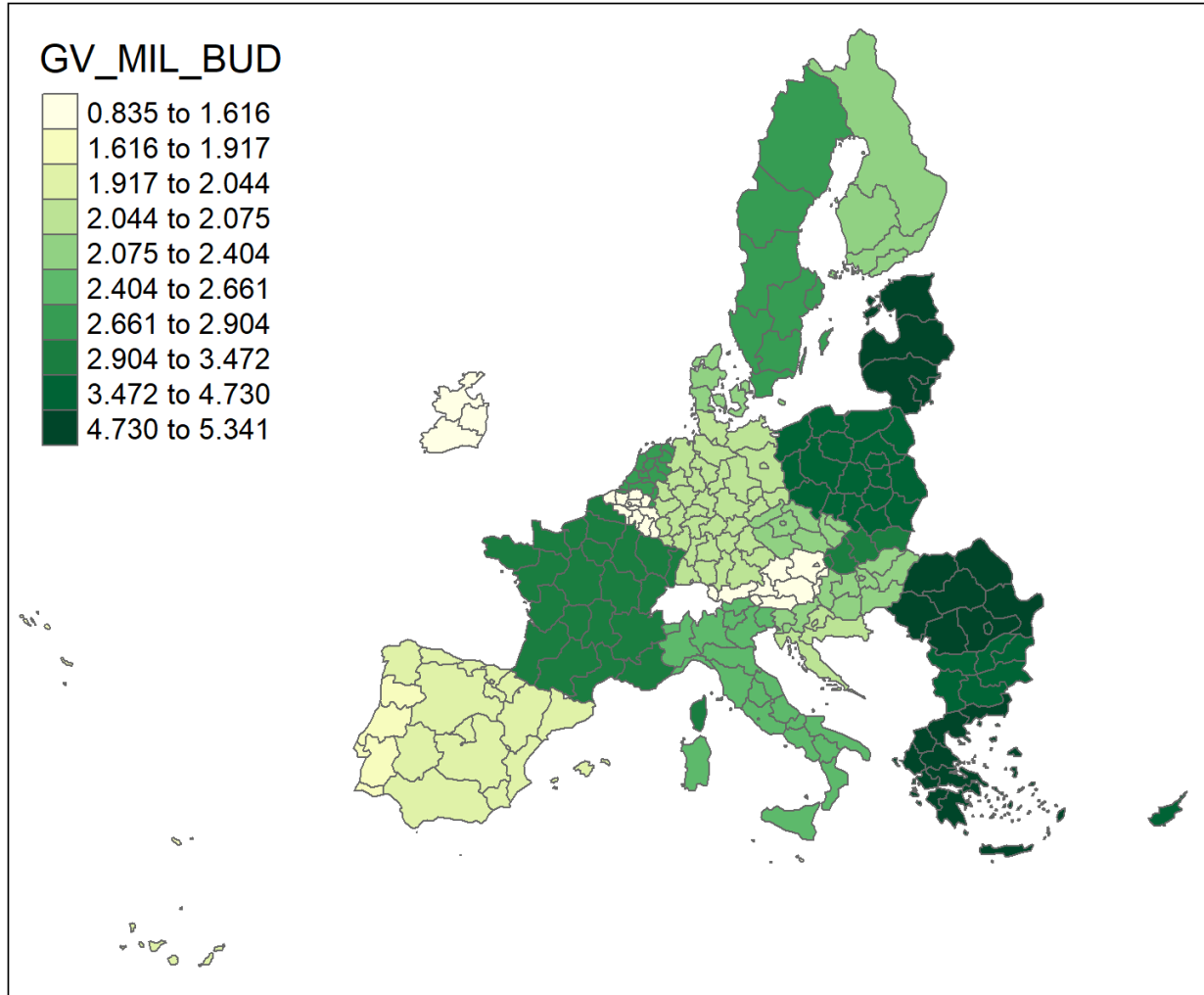


Variety of indicators used in the analysis

Dimension	Vulnerability	Exposure	Consequence	Total
Social	23	4	6	33
Institutional	1	0	0	1
Economic	12	6	5	23
Infrastructural-environmental	13	4	0	17
Geopolitical-strategic	2	8	2	12
Final Sum	51	22	13	86



Share of GDP spent on defence (2021)

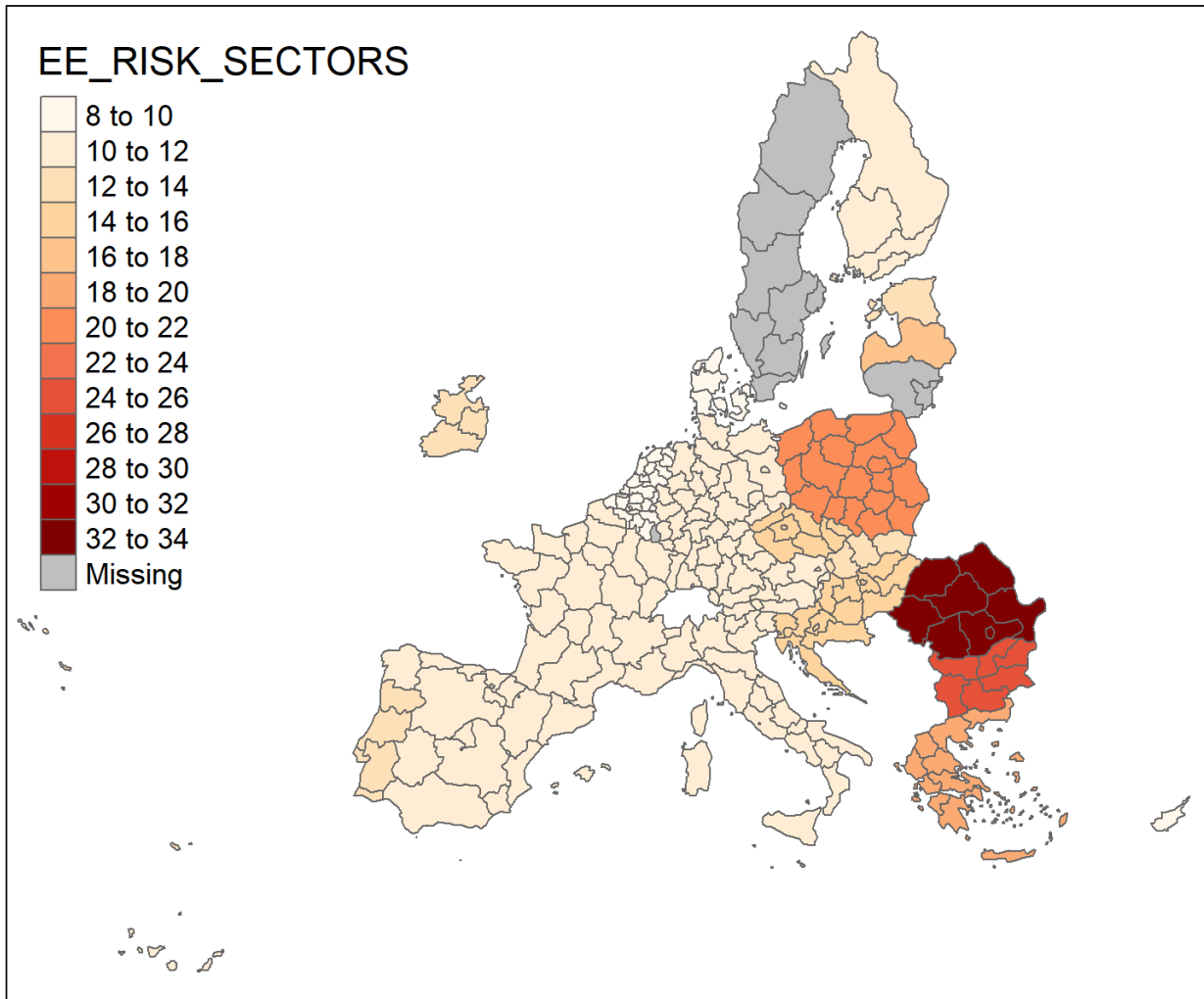


Growing defence budgets reflect heightened geopolitical risks across Europe, with **Poland** markedly expanding military expenditure and emerging as a key regional security actor.

VULNERABILITY



Share of employment in high-risk sectors (2021)

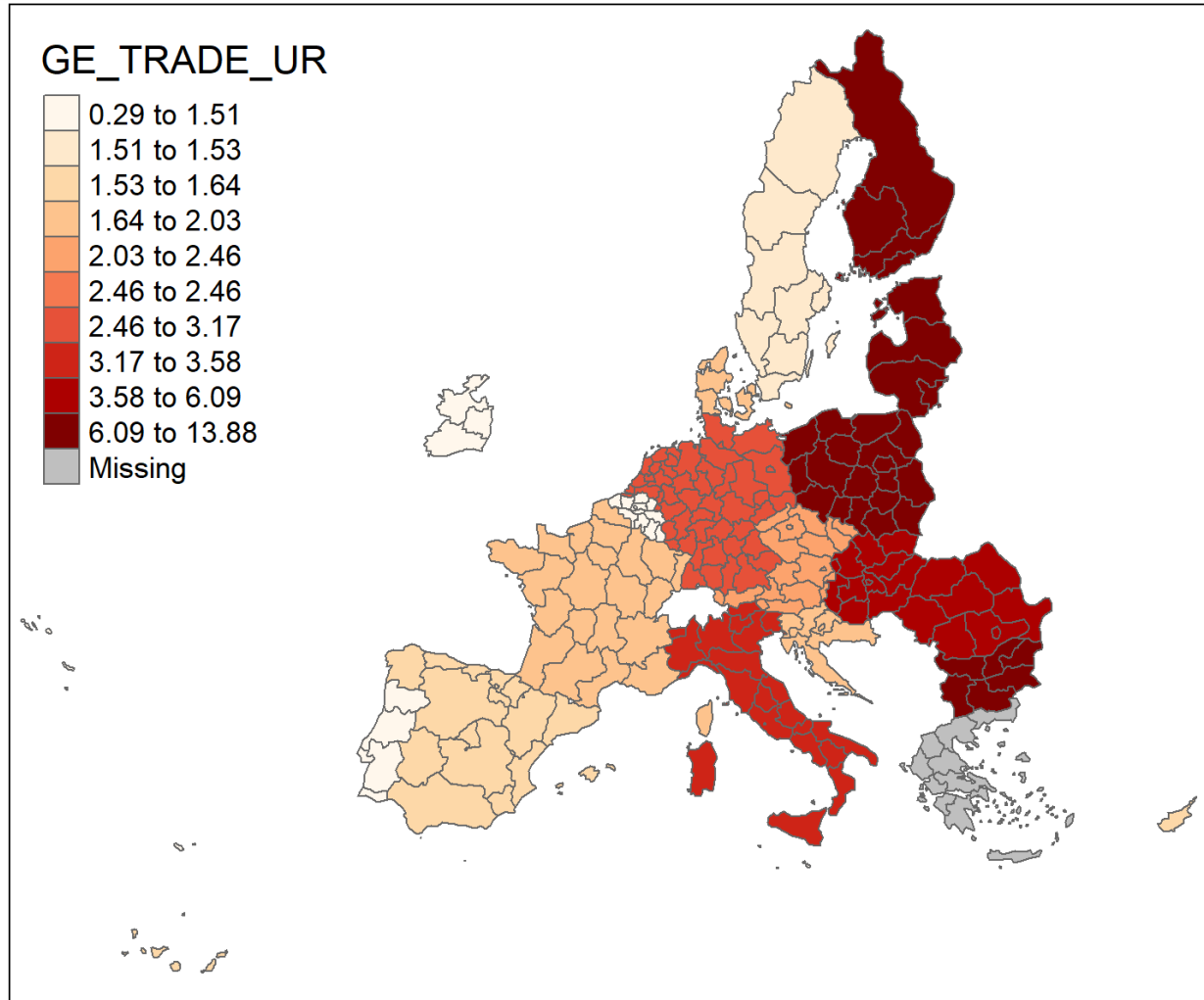


Regions dependent on low-tech and agricultural industries remain most vulnerable to economic shocks, while in **Poland** such exposure persists mainly in peripheral and mono-industrial counties outside major urban areas.

EXPOSURE



Share of Russia and Ukraine in international trade of the country (2021)

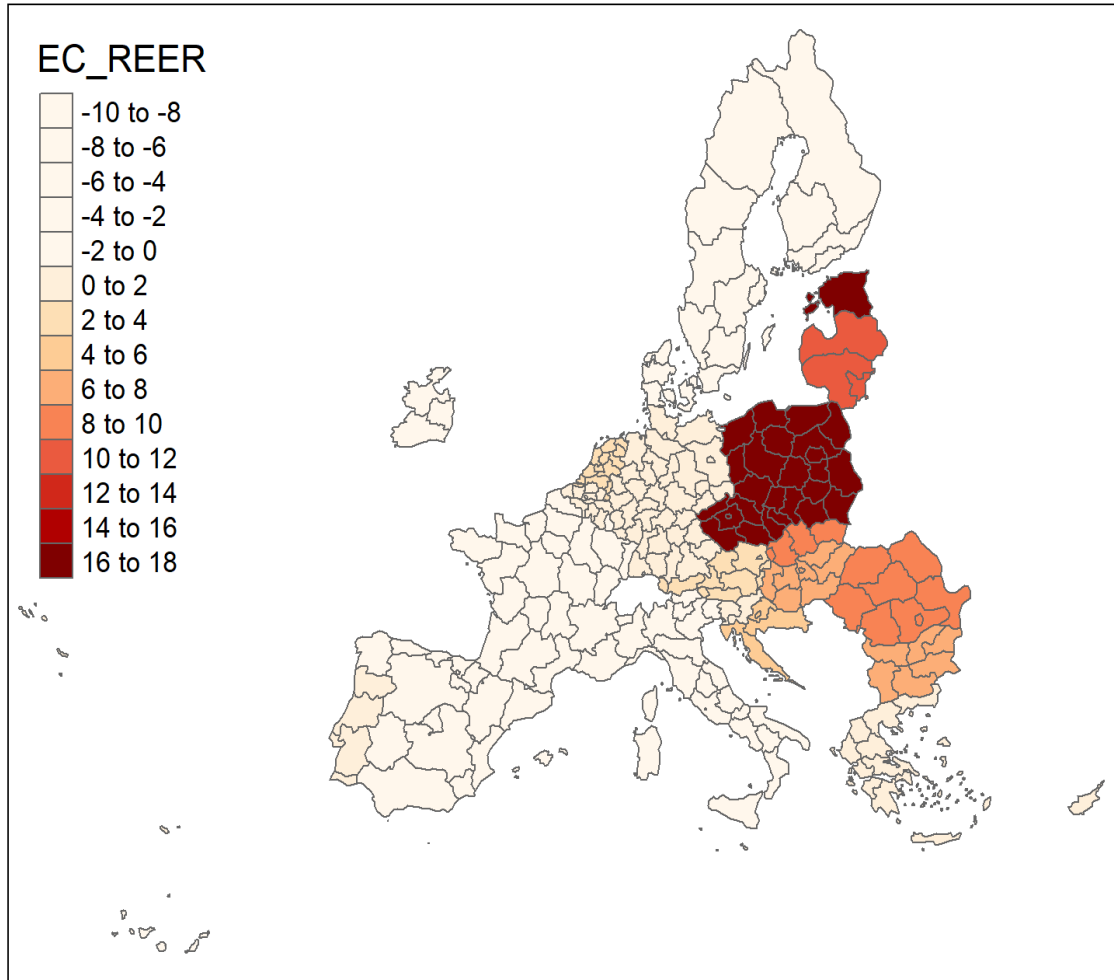


Strong pre-war trade links created significant exposure to disruption, and in **Poland** this dependence triggered a rapid reorientation of exports and supply chains, especially in western regions.

EXPOSURE



Change in Real Effective Exchange Rate (2024/2021)



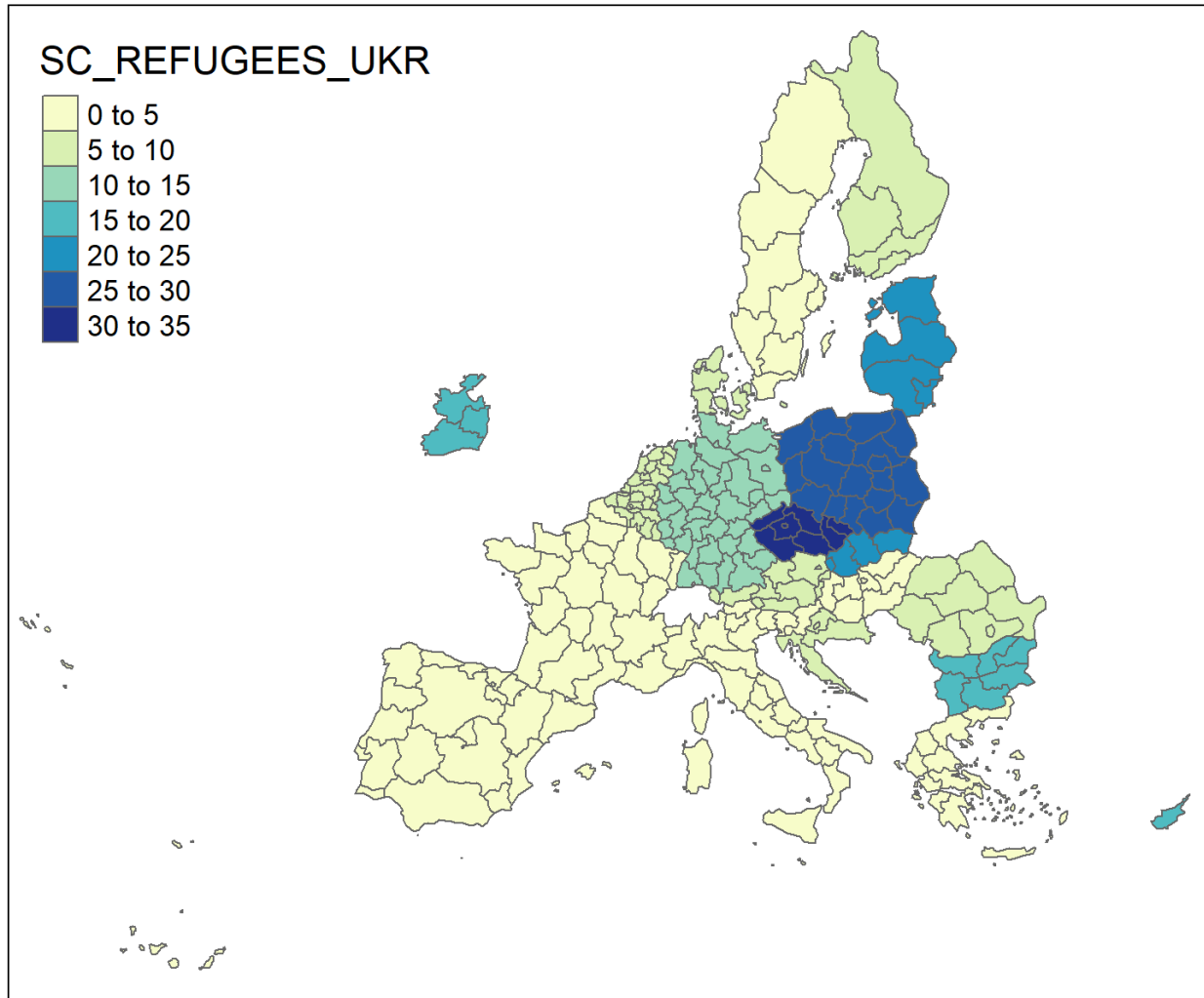
CONSEQUENCE

The Real Effective Exchange Rate (REER) captures changes in a country's price and cost competitiveness relative to its trading partners — an increase in REER indicates a loss of competitiveness, as domestic prices and wages rise faster than abroad.

In **Poland**, the REER rose significantly between 2021 and 2024, reflecting growing cost pressures and currency appreciation. This trend signals declining external competitiveness, particularly in export-oriented industrial regions. Yet, regions with diversified economic structures and innovation capacity managed to offset these effects, maintaining resilience through structural adaptability rather than price-based advantage.



Ukrainian beneficiaries of temporary protection (per thousand persons – average from 2022-2025)



Mass refugee inflows reshaped demographic and social structures across Central Europe, and in **Poland** they mobilised an exceptional civic response, turning local solidarity into a foundation of social resilience.

CONSEQUENCE



From Empirical Mapping to Typological Insights

The upcoming research stage focuses on the typological analysis of European regions affected by multi-crisis dynamics. Building on quantitative indicators from TIPERICO and RECORU, we aim to identify distinct resilience profiles that explain how territorial systems adapt under compounded shocks.

Expected outcomes:

- Identification of regional resilience types in Central and Eastern Europe.
- Deeper understanding of how peripheral regions adjust and reorient under systemic shocks.
- Analytical input for the post-2027 EU Cohesion Policy, integrating resilience as a key development principle.



General conclusions

- The combined shocks of the pandemic and the war in Ukraine intensified spatial inequalities but also revealed strong adaptive capacities within local systems.
- Regional resilience in Central Europe is multi-dimensional, shaped by economic structure, institutional capacity, and social cohesion.
- Local and regional actors demonstrated the ability to reorganize and adapt, transforming temporary responses into longer-term strategies.
- A policy shift is required: from compensating vulnerability to building structural resilience as a principle of post-2027 EU Cohesion Policy.
- In **Poland**, the war and energy crisis accelerated the reconfiguration of regional development patterns — strengthening metropolitan regions while exposing structural weaknesses of inner peripheries.
- The extraordinary mobilisation of local communities and self-governments during the refugee and energy crises confirmed that social and institutional capital are the key drivers of resilience in **Polish regions**.



Category-Specific Conclusions

Dimension	Exposure	Consequences	Vulnerability
Social	Border & reception areas face high migration inflows.	Community mobilisation cushioned disruption.	Strong civic networks & trust sped adaptation.
Institutional	Fragmented administrations limit coordination.	Unequal access to resources widens recovery gaps.	Dense inter-municipal & cross-sector partnerships lower sensitivity.
Economic	Peripheral regions more exposed to trade/energy shocks.	Stronger inflation & output losses in mono-industrial areas.	Diversified, innovation-intensive regions less sensitive.

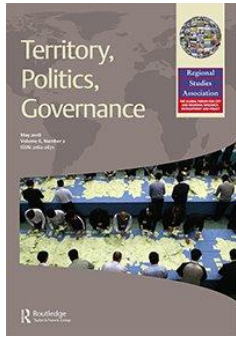


Category-Specific Conclusions

Dimension	Exposure	Consequences	Vulnerability
Infrastructural	Regions reliant on gas networks and weak grid/digital coverage are more exposed.	Service disruptions and higher operating costs; bottlenecks in logistics and energy delivery.	Redundant, well-maintained, and digitally enabled infrastructure (grid capacity, interconnections, broadband) reduces sensitivity.
Environmental	Higher exposure where fossil-fuel dependence and air-polluting heat sources dominate.	Short-term degradation risks (air quality, waste streams); acceleration of local RES uptake.	Systems with prior efficiency measures, green planning, and ecosystem buffers are less sensitive.
Geopolitical-Strategic	Proximity to border & trade dependence heighten exposure.	Sudden rerouting of trade/transport; security spending trade-offs	NATO/EU anchoring and diversified partners lessen sensitivity.



Selected forms of disseminating the results



Adamiak C., Rodríguez-Pose A., Churski P., Dubownik A., Pietrzykowski M., Szyda B., Rosik P., 2024.

Places that matter and places that don't:
Territorial revenge and counter-revenge in Poland.

Territory, Politics, Governance.

<https://doi.org/10.1080/21622671.2024.2431702>



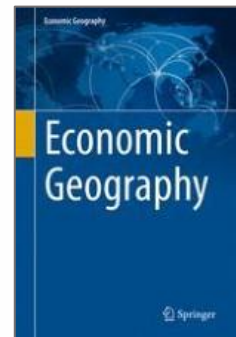
Churski P., Adamiak C., Dubownik A., Komornicki T., Pietrzykowski M., Szyda B., Śleszyński P.

The changing role of functional urban areas in regional policy: New challenges for place-based policy in new conditions of development.

Regional Science Policy & Practice.

Special Issue: Left Behind Areas. Past, Present and Future

<https://doi.org/10.1016/j.rspp.2025.100221>



Churski P., Adamiak C., Dubownik A., Pietrzykowski M., Szyda B., 2025.

Inner Peripheries in the New Conditions of Cohesion
post-SARS-CoV-2 - recommendations for European Cohesion Policy.

Economic Geography. Springer. **After review**





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PROJECT OPUS 25 -2023/49/B/HS5/00256



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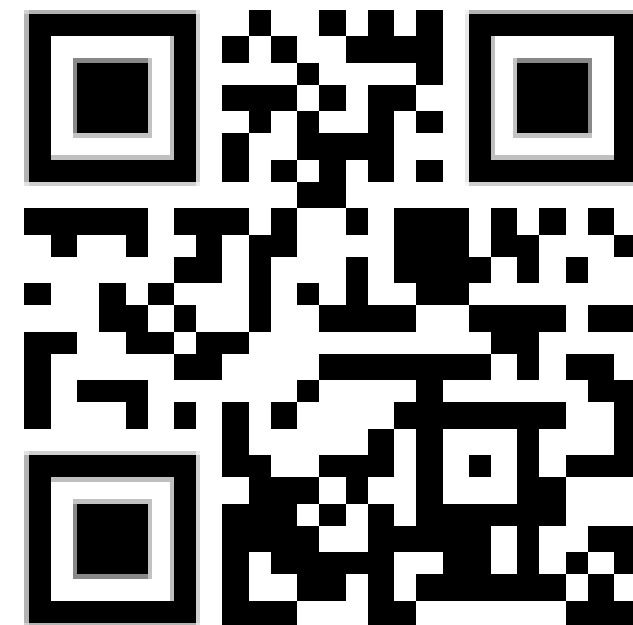
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See more:



Annex 1: Social Indicators part 1

Code	Dimension RECORU	Dimension (literature)	VEC Component	Indicator
SV_TRUST_OTHERS	Social	Social	Sensitivity	Trust in others (rating 0-10)
SV_TRUST_INST	Social	Social	Sensitivity	Trust in public institutions (%)
SV_PARTICIPATION	Social	Social	Sensitivity	Persons participating in formal/informal voluntary activities or active citizenship
SV_ONLINE_AUTH	Social	Social	Sensitivity	Share of population using Internet in interaction with public authorities (last 12 months)
SV_BOUND	Social	Social	Sensitivity	Persons getting together with family (relatives) or friends at least once a week
SV_ATTACH_CTV	Social	Social	Sensitivity	Share of population very attached to city/ town/ village (%)
SV_ELECT_NAT	Social	Social	Sensitivity	Parliamentary elections turnout (%)
SV_ELECT_EP	Social	Social	Sensitivity	European Parliament elections turnout (%)
SV_EDU_HIGHER	Social	Social	Sensitivity	Share of population 25 to 65 years with tertiary education (levels 5-8 by ISCED 2011)
SV_EDU_PRIM	Social	Social	Sensitivity	Share of population 25 to 65 years with less than primary, primary and lower secondary education (levels 0-2)
SV_POVERTY	Social	Social	Sensitivity	Persons at risk of poverty or social exclusion (%)
SE_HOSP_BEDS	Social	Social	Sensitivity	Available beds in hospitals per hundred thousand inhabitants
SV_PUPILS_PRE	Social	Social	Sensitivity	Pupils enrolled in early childhood education as % of corresponding age population
SV_MEAN_AGE	Social	Demographic	Sensitivity	Mean population age
SV_AGE_65PLUS	Social	Demographic	Sensitivity	Proportion of population aged 65 years and more
SV_AGE_DEPEND	Social	Demographic	Sensitivity	Old-age dependency ratio 1st variant (population 65 years or over to population 15 to 64 years)



Annex 1: Social Indicators part 2

Code	Dimension RECORU	Dimension (literature)	VEC Component	Indicator
SV_EVENNESS	Social	Demographic	Sensitivity	Age structure evenness index
SV_FERTILITY	Social	Demographic	Sensitivity	Total fertility rate
SV_POP_DYN	Social	Demographic	Sensitivity	Population change in 10 years
SV_AGE_PROD	Social	Demographic	Sensitivity	Proportion of population in productive age
SV_AGE_CHILD	Social	Demographic	Sensitivity	Proportion of children (0-14) in population
SV_BIRTHS_35	Social	Demographic	Sensitivity	Share of births by mothers over 35 years old
SV_RES_CHANG	Social	Demographic	Sensitivity	Residence changed one year before census
SE_TRUST_MEDIA	Social	Social	Exposure	Share of population claiming that media provide trustworthy information (%)
SE_POP_DENS	Social	Demographic	Exposure	Population density (persons per square kilometre)
SE_MIGRANTS	Social	Demographic	Exposure	Odsetek migrantów zagranicznych w populacji
SE_URBAN	Social	Demographic	Exposure	Share of population living in cities, towns and suburbs
SC_POVERTY	Social	Social	Consequence	Persons at risk of poverty or social exclusion (%), change 2021-2024
SC_POPULATION	Social	Demographic	Consequence	Change in population 2021-2024
SC_FERTILITY	Social	Demographic	Consequence	Change in total fertility rate
SC_MIGRATION	Social	Demographic	Consequence	Net migration balance
SC_REFUGEES_UKR	Social	Demographic	Consequence	Ukrainian beneficiaries of temporary protection (per thousand persons)
SC_DEATHS	Social	Demographic	Consequence	Excessive deaths in 2023 compared to 2019



Annex 1: Institutional indicators

Code	Dimension RECORU	Dimension (literature)	VEC Component	Indicator
IV_GOV_NAT	Institutional	Institutional	Sensitiivity	Mean of Worldwide Governance Indicators



Annex 1: Economic indicators

Code	Dimension RECORU	Dimension (literature)	VEC Component	Indicator
EV_GDP	Economic	Economic	Sensitivity	Gross domestic product (GDP) at current prices (Euro per inhabitant)
EV_GDP_SD	Economic	Economic	Sensitivity	Standard deviation of GDP 2005-2021
EV_HERFINDAHL	Economic	Economic	Sensitivity	Herfindahl sectorial concentration index (using employment in 10 NACE Rev 2 sectors)
EV_INDUSTRY	Economic	Economic	Sensitivity	Share of industry in GDP
EV_UNEMP	Economic	Economic	Sensitivity	Unemployment rate among population from 15 to 74 years
EV_EMP	Economic	Economic	Sensitivity	Employment rate among population from 15 to 74 years
EV_SMALL	Economic	Economic	Sensitivity	Share of employment in firms below 10 employees
EV_FIXED	Economic	Economic	Sensitivity	Gross fixed capital formation in total economy per capita
EV_INTERNET	Economic	Economic	Sensitivity	Households that have internet access at home
EV_NET_NFC	Economic	Economic	Sensitivity	Net position of non-financial corporations as % of GDP
EV_RD	Economic	Economic	Sensitivity	R&D personnel and researchers (FTE as % of population in the labour force)
EE_EXPORT_GDP	Economic	Economic	Exposure	Share of export in GDP
EE_UKRRUS_EXP	Economic	Economic	Exposure	Share of export to Rusia and Ukraine in total export
EE_NACE_GI	Economic	Economic	Exposure	Share of gross value added in NACE sectors G-I: Wholesale and retail trade, transport, accommodation and food service activities
EE_FDI	Economic	Economic	Exposure	Inward FDI stocks in % of GDP
EE_EXPORT_DIST	Economic	Economic	Exposure	Distance to main export market
EE_RISK_SECTORS	Economic	Economic	Exposure	Share of employment in high-risk sectors
EC_GDP	Economic	Economic	Consequence	Change in gross domestic product (GDP) at current (Euro per inhabitant)
EC_UNEMP	Economic	Economic	Consequence	Change in unemployment rate among population from 15 to 74 years
EC_LOSS	Economic	Economic	Consequence	Counter-factual loss of household income
EC_NET_NFC	Economic	Economic	Sensitivity	Change in net position of non-financial corporations
EC_FIRM_DEATH	Economic	Economic	Consequence	Liczba upadłości przedsiębiorstw
EC_REER	Economic	Economic	Consequence	Change in Real Effective Exchange Rate



Annex 1: Infrastructural-Environmental indicators

Code	Dimension RECORU	Dimension (literature)	VEC Component	Indicator
NV_PROTECT	Infrastructural-environmental	Environmental	Sensitivity	Share of protected areas
NV_AIR_POL	Infrastructural-environmental	Environmental	Sensitivity	Air Pollution Population Weighted Average (ug/m3)
NV_VEGET	Infrastructural-environmental	Environmental	Sensitivity	Share of vegetation in land cover
NV_WATER	Infrastructural-environmental	Environmental	Sensitivity	Renewable freshwater resources (m3 per inh.)
NV_EROSION	Infrastructural-environmental	Environmental	Sensitivity	Estimated soil erosion by water (tonnes per hectare)
NV_LC_CHANGE	Infrastructural-environmental	Environmental	Sensitivity	Speed of land cover change
NE_EMISSION	Infrastructural-environmental	Environmental	Sensitivity	CO2 emission per capita
NV_FRAGMENT	Infrastructural-environmental	Infrastructural	Sensitivity	Landscape fragmentation index
NV_LU_MIX	Infrastructural-environmental	Infrastructural	Sensitivity	Land use mix index
NV_MOTORWAY	Infrastructural-environmental	Infrastructural	Sensitivity	Motorways network density (km per 100 km2)
NV_RAILWAY	Infrastructural-environmental	Infrastructural	Sensitivity	Railways network density (km per 100 km2)
NV_FP_CENTAL	Infrastructural-environmental	Infrastructural	Sensitivity	European Framework Programmes 2004-2014 strength centrality (albo inny miernik centralności)
NV_URBAN_INT	Infrastructural-environmental	Infrastructural	Sensitivity	Population density of urbanised areas
NE_HAZARD	Infrastructural-environmental	Environmental	Exposure	Economic damage due to four natural hazard
NE_TIME_HEALTH	Infrastructural-environmental	Infrastructural	Exposure	Average time accessibility to healthcare services
NE_TIME_EDU	Infrastructural-environmental	Infrastructural	Exposure	Average time accessibility to primary education services
NE_TIME_METRO	Infrastructural-environmental	Infrastructural	Exposure	Mean travel time from NUTS3 centres to nearest metropolitan region centre



Annex 1: Geopolitical-Strategic indicators

Code	Dimension RECORU	Dimension (literature)	VEC Component	Indicator
GV_MIL_BUD	Geopolitical-strategic	Geopolitical-strategic	Sensitivity	Share of GDP spent on defence
GV_MIL_OCCU	Geopolitical-strategic	Geopolitical-strategic	Sensitivity	Share of working population working in armed forces occupations
GE_GAS_CONS	Geopolitical-strategic	Geopolitical-strategic	Exposure	Natural gas consumption per capita
GE_ENER_IMP	Geopolitical-strategic	Geopolitical-strategic	Exposure	Energy import dependency (%)
GE_FUEL_RUS	Geopolitical-strategic	Geopolitical-strategic	Exposure	Share of fuels import from Russia in total fuels imports
GE_TRADE_UR	Geopolitical-strategic	Geopolitical-strategic	Exposure	Share of Russia and Ukraine in international trade of the country
GE_BORDER	Geopolitical-strategic	Geopolitical-strategic	Exposure	Border with a country participating in the war (dummy)
GE_DISTANCE	Geopolitical-strategic	Geopolitical-strategic	Exposure	Distance from the war zone
GE_CYBER	Geopolitical-strategic	Geopolitical-strategic	Exposure	Global Cybersecurity Index - Overall Score (ITU GCI)
GE_NET_CB	Geopolitical-strategic	Geopolitical-strategic	Exposure	Net position of central bank as % of GDP
GC_FDI	Geopolitical-strategic	Geopolitical-strategic	Consequence	Change in inward FDI net stock
GC_DISCOURSE	Geopolitical-strategic	Geopolitical-strategic	Consequence	Prevalence of war topic in public discourse

