



Policy Brief no. 2

Regional attractiveness and the twin transition: A new typology of EU regions





Key Messages

► **Regions with high digital and green attractiveness tend to retain or attract skilled workers.** Targeted investments in digital infrastructure, renewable energy, and liveability can reverse unattractive dynamics and net out-migration.

► **A new data-driven Regional Attractiveness Index (RAI)** maps EU regions across traditional, digital, and green pillars, offering insights into how territories position themselves within these transitions.

► **Regions with high digital and green attractiveness tend to retain or attract skilled workers.** Targeted investments in digital infrastructure, renewable energy, and liveability can reverse unattractive dynamics and net out-migration.

► **There is no one-size-fits-all approach;** policy interventions must be explicitly tailored to distinct regional profiles to ensure transition strategies are both targeted and cohesive.

Background & Context

Europe's territorial landscape is being reshaped by multiple transitions: **digital, green, demographic, and social**. Understanding how these transformations affect regional attractiveness is crucial for the design of place-based policies under EU Cohesion Policy, DG REGIO, and DG EMPL frameworks, as well as for rethinking existing policies at the national and regional levels.

The **MOBI-TWIN project** introduces an innovative analytical framework for assessing how regional characteristics shape population dynamics, labour mobility, and resilience. Building on this framework, the project developed a **Regional Attractiveness Index (RAI)**, mapping the key dimensions of regional attractiveness: traditional (demogra-

phic, economic, and accessibility factors), digital (technological readiness, innovation ecosystems, and digital infrastructure), and green attractiveness (environmental performance, energy transition capacity, and sustainability assets). The tool enables policymakers to monitor key dimensions of regional attractiveness, tracking their region's performance and evolution.

Leveraging the RAI tool, the MOBI-TWIN project has developed a **data-driven classification of EU regions** across the three complementary pillars, offering new insights into territorial positioning amidst the twin transition.

This typology serves as the **evidence base** for the development of spatial mobility scenarios and agent-based modelling, linking the RAI framework to broader questions of twin transition, spatial mobility, and regional competitiveness.

“

—

This multidimensional typology enables policymakers to tailor interventions that align with specific regional profiles, such as industrial restructuring needs, digital gaps, or environmental vulnerabilities.

Regional Attractiveness Index

The **Regional Attractiveness Index (RAI)** integrates over 40 indicators from Eurostat, JRC, and regional databases to capture the capacity of regions to attract and retain people. The index groups regions into a balanced picture of strengths and weaknesses across three pillars:

1 Traditional pillar

GDP per capita, employment, accessibility, and demographic potential

2 Digital pillar

ICT infrastructure, R&D intensity, innovation activity, and human capital

3 Green pillar

renewable-energy use, circular-economy performance and environmental quality

Regions are benchmarked against EU averages and grouped into typologies representing different combinations of attractiveness across these three dimensions.

Key Findings

- **Persistent Inequalities:** Northern/Western and capital regions consistently outperform Southern/Eastern and non-capital areas across traditional, digital, and green dimensions.
- **Digital Growth:** Digital infrastructure is improving Europe-wide, with lagging South/East regions catching up via targeted investments.
- **Green Transition:** Progress is modest; the North leads, while Southern/Eastern regions face funding and structural hurdles.

RAI for Traditional Factors (2020).

High scores cluster in Northern, Western, and parts of Central Europe (e.g., Scandinavia, Luxembourg, Ireland, Netherlands). In contrast, lower scores in the East and South (Bulgaria, Romania, Greece) reflect persistent economic and infrastructure challenges. Notably, Belgium, Spain, and Italy exhibit massive internal disparities.

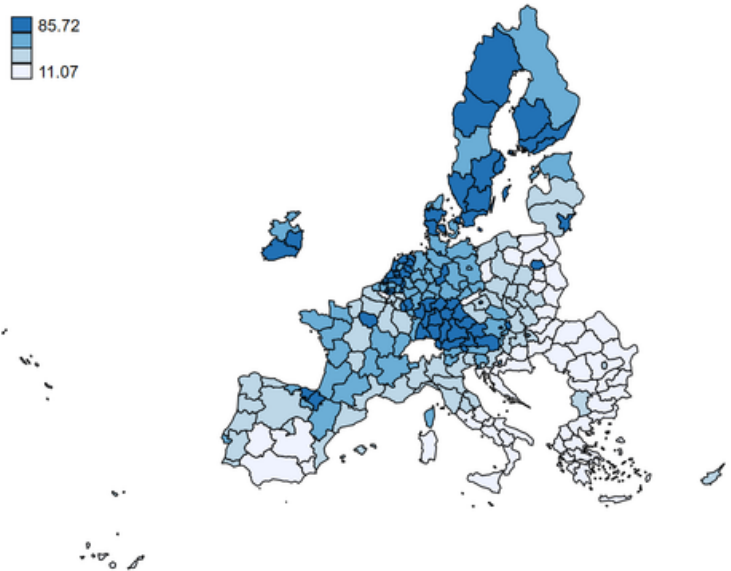


Figure 1. Geographical distribution of the RAI for traditional factors - 2020

RAI for Digital Factors (2020).

Strong digital infrastructure drives the highest scores in Northern and Western Europe (Finland, Denmark, the Netherlands, Sweden, Germany), alongside exceptional performance in parts of Central Europe (Hungary). Conversely, Eastern and Southern regions (Bulgaria, Romania, Greece) exhibit the lowest scores, facing persistent digital challenges.

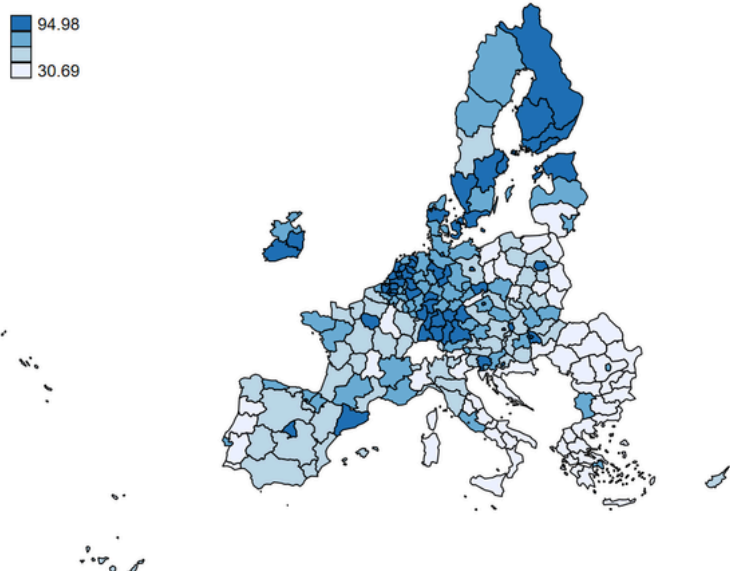


Figure 2. Geographical distribution of the RAI for digital factors - 2020

RAI for Green Factors (2020).

High-performing regions are concentrated in Northern Europe (Sweden, Finland, Baltics) and Central Europe (Austria, Luxembourg), reflecting consistent sustainability investments. Conversely, Southern and Eastern regions (Greece, Bulgaria, Romania) exhibit lower scores, highlighting a clear green transition divide.

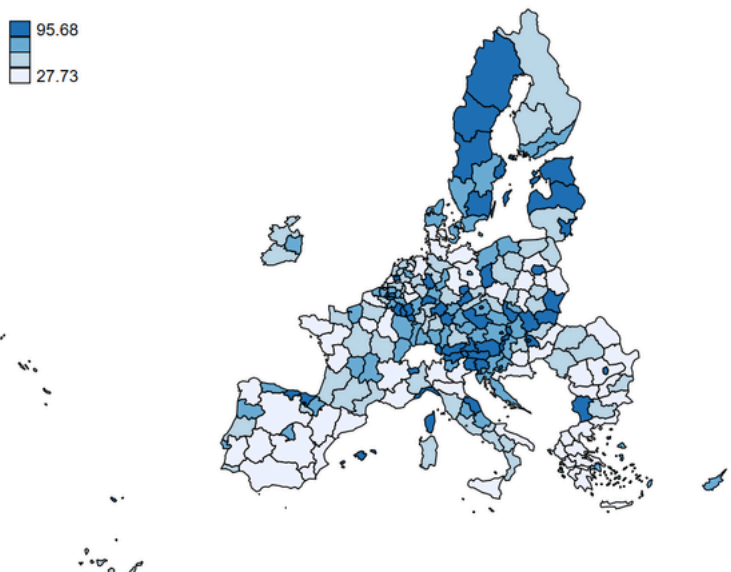


Figure 3. Geographical distribution of the RAI for green factors - 2020

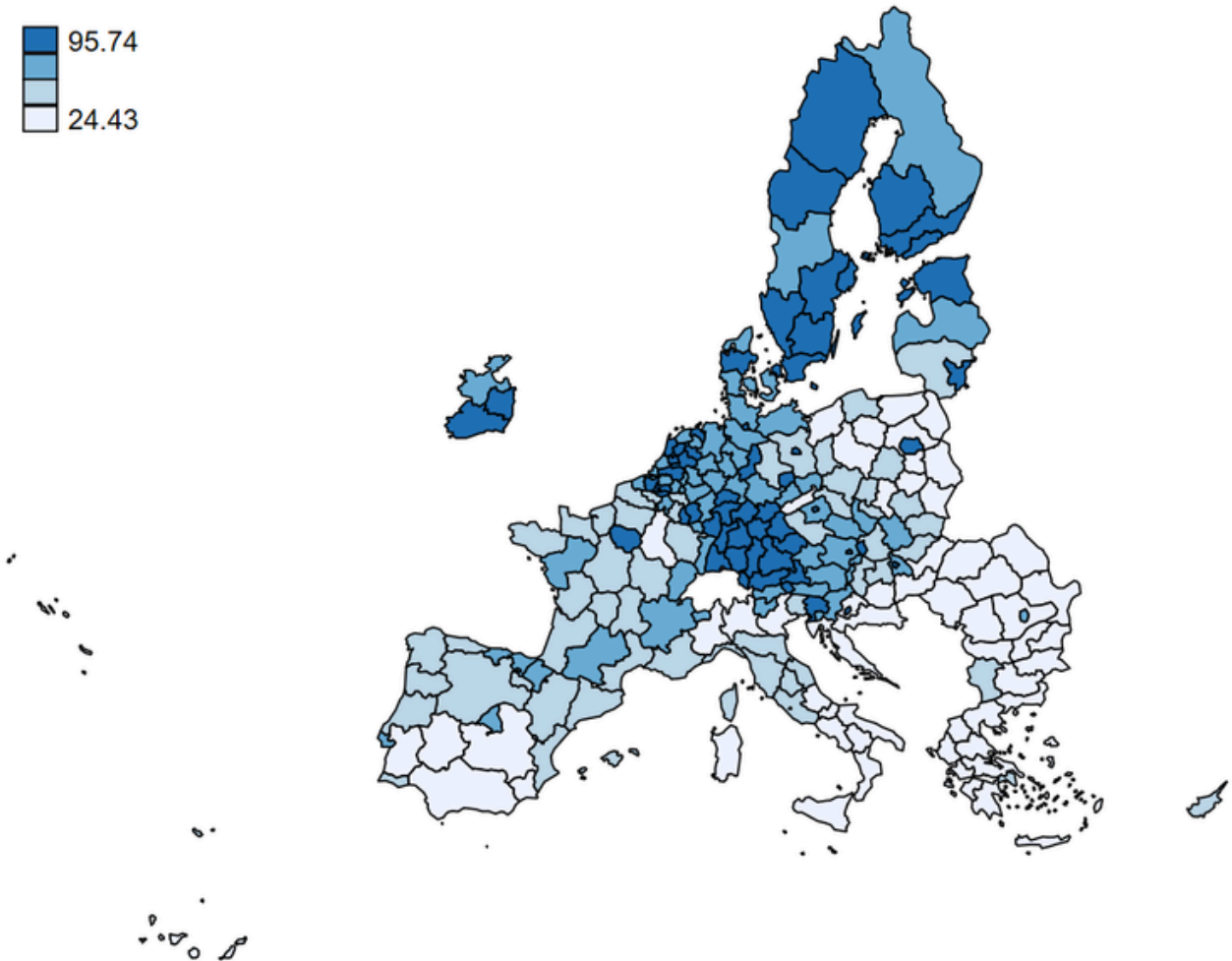
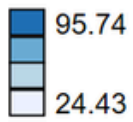


Figure 4. Geographical distribution of the RAI (overall) - 2020

Regional Attractiveness Index (2020).

Top scores concentrate in the North (Finland, Sweden), driven by strong infrastructure, and the West (Luxembourg, Ireland, Netherlands), driven by economic stability, alongside a notably strong performance from Estonia.

A woman wearing a hijab and a dark dress is walking away from the camera on a paved city street. In the background, there is a modern building with a glass facade and some greenery. The scene is brightly lit, suggesting a sunny day.

“Regions with high digital and green attractiveness tend to retain or attract skilled workers, while regions with low scores experience net out-migration, reinforcing demographic and economic decline.”

A Typology of EU Regions

Cluster analysis reveals **six main regional types**, each facing distinct development challenges and opportunities.

The typology demonstrates that regional competitiveness and demographic vitality are increasingly shaped by digital and green capacities rather than traditional economic size alone.

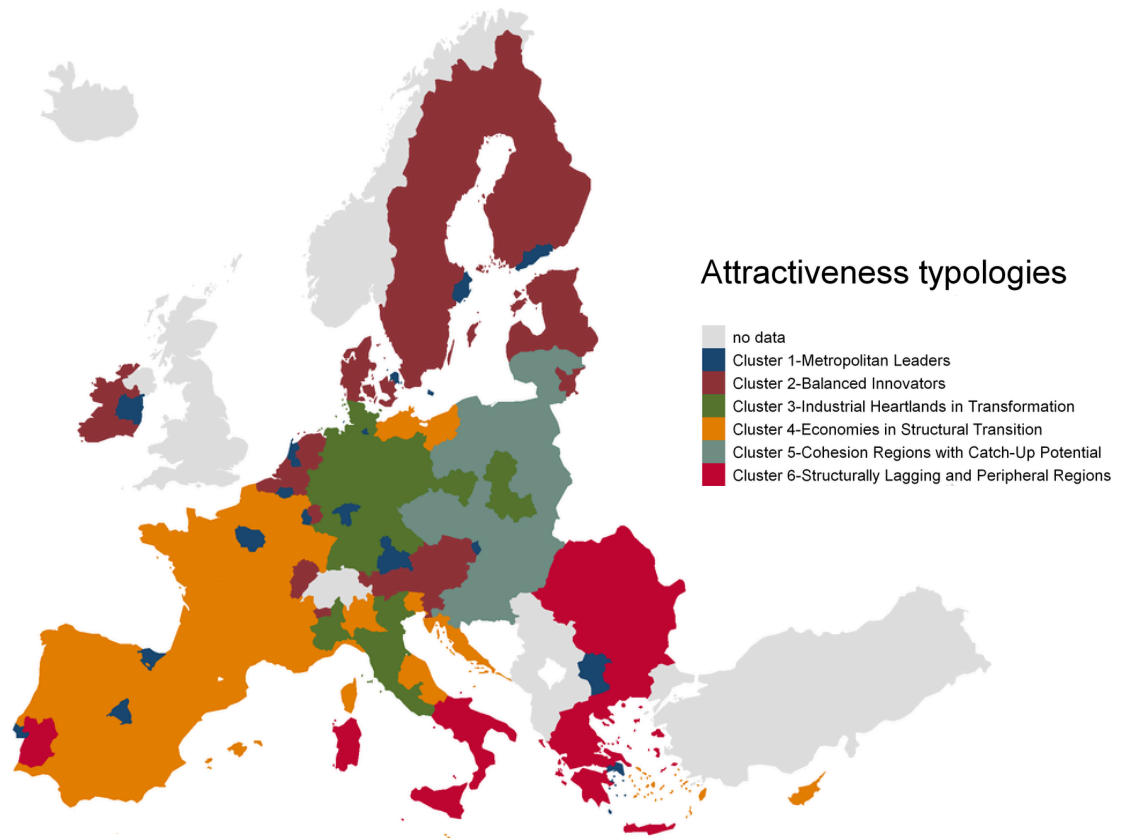


Figure 5. Regional clusters of attractiveness in the EU (Ward's Method, $k = 6$)

Cluster 1: Metropolitan Leaders

Key characteristics:

- Highly attractive and innovative regions, with exceptional overall RAI scores driven by strong digital, green, and traditional pillars.
- Economic and technological leaders, showing top GDP per capita, high-tech employment, and advanced institutional and innovation capacity.
- Digitally advanced territories, exhibiting excellent broadband coverage and strong adoption of digital technologies.
- Facing structural and social pressures, including high living costs, spatial inequalities, and environmental stress due to dense urbanization.
- Strategic EU frontrunners in the twin transition, but at risk of stagnation, congestion, and complacency if inclusivity and affordability challenges remain unaddressed.

Indicative regions:

Metropolitan and capital regions, including Paris, Brussels, Vienna, Madrid, Berlin and Stockholm.

Cluster 2: Balanced Innovators

Key characteristics:

- Balanced and improving regions, showing steady progress across traditional, green, and digital pillars with stable governance and infrastructure foundations.
- Moderately innovative economies, with emerging but still limited high-tech and global competitiveness compared to metropolitan leaders.
- Strong public service performance and high broadband access, enabling inclusive development and gradual digital transition.
- Well-positioned for twin transition, acting as pilot regions for integrated green and digital strategies and sustainable regional innovation.
- Facing demographic and investment pressures, with risks linked to ageing populations, talent attraction, and maintaining innovation momentum.

Indicative regions:

Zuid-Holland, Noord-Brabant, Prov. Antwerpen, Västsverige, Salzburg, Etelä-Suomi, Midthjylland, Tirol

Cluster 3: Industrial Heartlands in Transformation

Key characteristics:

- Industrial and manufacturing strongholds, with solid traditional economic bases rooted in logistics and production sectors.
- Economically stable regions, showing favourable employment rates, moderate GDP per capita, and reliable infrastructure networks.
- Lagging in digital and green dimensions, with modest high-tech employment and limited adoption of advanced digital tools.
- Facing demographic and innovation constraints, including ageing populations and institutional inertia slowing adaptation.
- Key candidates for industrial modernisation, with strong potential to lead Industry 4.0, green manufacturing, and energy-efficient transformation if adequately supported.

Indicative regions:

Germany (e.g., Stuttgart, Düsseldorf, Köln, Hannover, Bremen), northern Italy (Piemonte, Emilia-Romagna, Veneto), and selected Polish industrial regions (Śląskie, Małopolskie).

Cluster 4: Economies in Structural Transition

Key characteristics:

- Moderately attractive and improving regions, showing gradual progress in digital & green pillars supported by EU cohesion funding.
- Economically modest but stable. Low GDP per capita and strong broadband access contributing to incremental modernization.
- Benefiting from affordability and quality of life, offering competitive living conditions that can attract remote workers and new investment.
- Facing institutional and structural constraints, including weak governance capacity, limited policy implementation, and persistent traditional-sector dependence.
- Strategic potential for green & digital convergence, particularly in tourism, circular economy, and environmental policy leadership, if supported by targeted investment.

Indicative regions:

France (e.g., Rhône-Alpes, Provence-Alpes-Côte d'Azur), Spain (Cataluña, Comunitat Valenciana, Andalucía), Italy (Lombardia, Liguria, Umbria), Portugal (Norte, Algarve), Malta and Cyprus.

Cluster 5: Cohesion Regions with Catch-Up Potential

Key characteristics:

- Cohesion-supported transition regions, showing solid green performance and improving digital capacity through EU funding.
- Young and affordable regions, with favourable living conditions and significant long-term human capital potential.
- Emerging innovation performers, gradually catching up in green and digital dimensions but still constrained by institutional fragility.
- High dependence on traditional sectors and EU support, with limited diversification and persistent vulnerabilities in governance and skills.
- Promising testbeds for sustainable growth, capable of leapfrogging development stages if institutional capacity and innovation ecosystems are strengthened.

Indicative regions:

Poland (e.g., Wielkopolskie, Pomorskie), Hungary (Pest, Nyugat-Dunántúl), Slovakia (Západné Slovensko, Východné Slovensko), Czech Republic (Moravskoslezsko, Střední Čechy), Croatia (Panonska Hrvatska), Lithuania (Vidurio ir vakarų Lietuvos regionas).

Cluster 6: Structurally Lagging and Peripheral Regions

Key characteristics:

- Lagging but green-oriented regions, showing low overall attractiveness but relatively strong environmental performance and low GHG emissions.
- Economically and institutionally fragile, with weak governance, low broadband access, and limited digital and traditional competitiveness.
- Dependent on cohesion funding, using EU support mainly for infrastructure and connectivity improvements.
- Rich in natural and environmental assets, offering potential for eco-tourism, organic agriculture, and low-impact rural development.
- Facing demographic and structural risks, including persistent outmigration, ageing, and vulnerability to climate and economic shocks.

Indicative regions:

Greece (Kriti, Peloponnisos, Voreio Aigaio), southern Italy (Campania, Calabria, Sicilia, Sardegna), Bulgaria (Severozapaden, Severoiztochen), Romania (Nord-Vest, Sud-Vest Oltenia), and peripheral regions of Portugal (Alentejo).

Regional Attractiveness and Mobility

The analysis revealed a strong correlation between RAI scores and intra-EU mobility flows.

Regions with **high digital and green attractiveness** tend to **retain or attract** skilled workers.

Regions with **low scores** experience **net out-migration**, reinforcing demographic and economic decline.

The evidence underscores that mobility outcomes are **policy-sensitive**: while traditional factors remain pivotal, targeted investments in digital infrastructure, renewable energy, and liveability can reverse unattractive dynamics.

Policy Relevance for EU Cohesion

The RAI typology aligns closely with **EU priorities for smart, green, and inclusive growth**, offering a quantitative foundation for:

- **Programming ERDF and ESF+ funds** according to regional capacities and vulnerabilities.
- **Supporting Just Transition Mechanism** allocations based on structural vulnerability and transition potential.
- **Guiding Smart Specialisation Strategies (S3)** to foster digital-green complementarities and strengthen local innovation ecosystems.
- **Enhancing evidence-informed governance**, allowing EU and national authorities to align territorial foresight, mobility management, and resilience planning.
- **Promoting cross-regional cooperation** by linking regions with similar profiles, facilitating peer learning and coordinated transition paths.

Policy Recommendations

1. Tailor twin-transition policies to regional profiles.

- **Metropolitan Leaders:** manage growth sustainably through affordable housing, green mobility, and congestion reduction; reinforce their role as innovation hubs.
- **Balanced Innovators:** strengthen their connector role via R&D investment, digitalisation, and linkages with both core and peripheral areas.
- **Industrial Heartlands:** prioritise industrial modernisation, reskilling, and clean technology adoption to mitigate structural decline.
- **Structural Transition Economies:** enhance governance quality, digital connectivity, and housing to attract human capital and stimulate transformation.

- **Catch-Up Cohesion Regions:** channel cohesion funds to education, digital access, and entrepreneurship to counter demographic decline.
- **Structurally Lagging Regions:** implement long-term place-based programmes combining essential services, eco-innovation, and connectivity improvements.

2. Strategic alignment of funding and governance with territorial realities.

- **Differentiate funding by typology:** adapt instruments like the Cohesion Policy and Just Transition Fund to the specific profiles of each cluster.
- **Empower multi-level governance:** strengthen the

role of regional and local authorities to co-design strategies that are directly aligned with their specific cluster characteristics.

- **Foster typology-based partnerships:** support peer-to-peer initiatives under Interreg and ESPON to build analytical capacity and mutual learning, specifically between regions sharing the same RAI typology.
- **Leverage mobility for resilience:** enhancing mobility infrastructure (e.g., housing and transport) to support permanent and seasonal workers, particularly in Clusters 1 and 2. Expanding interregional and international student exchange programmes will be particularly beneficial in Clusters 3, 4, and 5, to enhance attractiveness and retain future talent.

3. Standardize diagnostic tools for transition monitoring.

- **Establish an EU Regional Attractiveness Observatory:** create a central body to track transition progress across

territories using the three RAI pillars: traditional, digital, and green.

- **Integrate indicators into policy dashboards:** embed specific RAI metrics into diagnostic tools, such as the JRC's Regional Resilience Dashboard, to identify territorial strengths and vulnerabilities.
- **Strengthen data-driven governance capacity:** promote the use of regional foresight and RAI monitoring at all government levels to ensure evidence-based decision-making.
- **Refine mobility metrics:** complement RAI data with indicators of well-being, permanent migration, and telework to capture the evolving preferences of mobile citizens.

Conclusions

Regional attractiveness is a cornerstone of Europe's resilience and a vital enabler of the twin transition. Understanding where regions stand in their digital, green, and social transformation allows policy-makers to design interventions that are both targeted and cohesive. The **MOBI-TWIN Regional Attractiveness Index (RAI)** typology offers a science-based compass for navigating the challenges of demographic change, mobility, and territorial disparities. By linking performance indicators with transition readiness, **the typology supports a more balanced and forward-looking Europe—one where every region can contribute to and benefit from the twin transition.**

This Policy Brief was written by: Anastasia Panori, Christina Kakderi, Elli Papastergiou, Dimitra Konstantinidou, and Nikolaos Tsioras (Aristotle University of Thessaloniki); Vicente Royuela and Jordi López-Tamayo (University of Barcelona).

Layout: Elli Papastergiou (Aristotle University of Thessaloniki)

Consortium:



Disclaimer: The information and views set out in this publication are those of the authors and do not necessarily reflect the official position of the European Commission.

Funded by the European Union's Horizon 2022 Framework Programme for Research and Innovation under grant agreement no. 101094402.



<https://mobi-twin-project.eu>



MOBI-TWIN Project



Funded by
the European Union



MOBI-TWIN