

TARGETED ANALYSIS

CE-FLOWS

Spatial dynamics and integrated territorial development scenarios for the functional area of central Europe

Synthesis report // October 2021

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This delivery does not necessarily reflect the opinions of members of the ESPON 2020 Monitoring Committee.

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This document is a Synthesis report.

Table of contents

Abbreviations	IV
1 The study	1
Introduction	1
Methodology	1
Key findings	1
2 Spatial Dynamics in the CE area	2
Flows and functional linkages	2
2.1 Unbalanced innovation and research performance across regions	2
2.1.1 Untapped potentials in innovation and manufacturing	2
2.2 Flow of people.....	2
2.2.1 Relevant socio-economic, institutional and cultural factors beyond cross-border mobility	2
2.2.2 Tourism and cultural heritage as drivers for mobility across the macro-region	3
2.3 Environmental hazards	3
2.3.1 Polarisation between urban and rural areas.....	3
2.3.2 Role of interregional and transnational cooperation in addressing environmental challenges	3
2.3.3 Heterogeneity in patterns of energy consumption and overall sustainability	3
2.4 Accessibility and connectivity	4
2.4.1 Interlinkages of manufacturing hubs and role of infrastructures	4
2.4.2 Strong relation between quality of infrastructures and cross-border commuting.....	4
2.4.3 Demographic and geographical features as a cause for limited integration	4
3 Spatial development scenarios for central Europe.....	5
3.1 Modelling of the scenarios	5
3.2 The “New normality” scenario	5
3.3 The integration scenarios and the role of COVID-19	5
4 Policy recommendations.....	7
4.1 Proposals for transnational policy implementation	7

Abbreviations

CE	Central Europe
ESPON	European Territorial Observatory Network
GIS	Geographic Information System
MASST	MAcroeconomic, Sectoral, Social, Territorial
MRS	Macro-Regional Strategies
NUTS	Nomenclature of Territorial Units for Statistics

1 The study

Introduction

This targeted analysis provides in-depth insights into the spatial dynamics and existing flows across regions in central Europe (CE) and identifies main development potentials, drivers and bottlenecks in that functional area. Emphasis is placed on how transnational cooperation structures, and governance mechanisms and solutions could be tailored to reduce economic and social disparities and foster integrated territorial development in CE. This analysis also identifies options and tools for transnational policy implementation to support the integrated territorial development of the CE functional area, thereby reducing disparities and fostering cohesion.

Methodology

To identify the main spatial development potentials, drivers and bottlenecks, a regional characterisation of the NUTS2 regions in the CE area was developed using a cluster analysis identifying regional patterns. The relationships between each cluster were then visualised via geographic information system (GIS) mapping. To fit the cluster analysis within the existing transnational cooperation structures and understand the connections between CE regions on different thematic areas, an analysis of existing partnerships was then performed. The identified characteristics of the CE regions and their regional resources (natural, human and economic) were then analysed through statistical techniques linking socio-economic development to regional assets.

Statistical analysis allowed to forecast different trends and scenarios of the future integration process within the CE area in view of 2030, highlighting what is going to be the territorial impact of the predicted/expected development trends and taking into account the current COVID-19 pandemic and the lockdown measures taken across Europe. Policy recommendations were then built based on existing cooperation patterns, transnational cooperation structures and governance mechanisms, exploiting complementarities and synergies with other EU instruments and policies (such as macro-regional strategies). Academic experts, professionals and public authorities from the regions working within the scope of this study were consulted through a Delphi survey, focus groups and workshops. They provided first-hand insights into drivers, bottlenecks, and expected developments of the CE area, and contributed to fine-tuning the future policy recommendations.

Key findings

- This study highlights **significant discrepancies** between regions of the CE area in terms of research and development patterns, accessibility and labour commuting, pollution, energy production and consumption.
- The degree of innovation is closely linked to the level of economic specialisation and specifically to **manufacturing activities**. Manufacturing activities in the CE area are driven by **hubs featuring high economic specialisation in terms of gross value-added generation, employment, and businesses in manufacturing activities**.
- However, these manufacturing hubs are partly hampered by a **persistent bottleneck represented by the insufficient interlinkages** between far eastern and western regions due to issues of transport interoperability and deficient car and rail infrastructures.
- Even if commuting flows between Member States are rapidly increasing in the CE area, **the absolute number of cross-border commuters remains relatively low compared to other regions in the EU**.
- The expected outcomes for **2030 in the New Normality scenario can be summarised by a significant economic growth** in the CE regions hit the hardest by the health crisis (e.g. Italian regions).
- However, the **overall economic performance of central and eastern regions remains stronger in the long run due to the lower losses registered during 2020**.
- The long-term impact of the pandemic on other economic and non-economic indicators different from GDP distinguishes the *New Normality* from the two *Integration scenarios*.

2 Spatial Dynamics in the CE area

Flows and functional linkages

2.1 Unbalanced innovation and research performance across regions

Research and development patterns show significant discrepancies between regions of the CE area. The highly urbanised hubs of the western regions are strongly endowed with researchers and well-connected in Horizon 2020 networks and INTERREG partnerships. Therefore, the **drivers of innovation are urbanised regions in the western parts of the CE area**, which generally feature well-integrated private and public R&D efforts.

The **disparities in terms of human capital endowment between more urbanised and less urbanised regions are even sharper in the eastern part of the CE area, and the lack of integration of these regions into R&D networks remain the greatest bottleneck to innovation.** Human capital in those regions (Poland, Czech Republic, Croatia, Slovakia, and Hungary) tends to emigrate to other regions in the west and north-west of Europe (e.g. Rheinland, Benelux): these regions are attractive because of their **very high innovation output and private R&D expenditures**. Furthermore, these regions possess vibrant ICT sectors, with high employment, high salaries and a sufficiently large number of innovative businesses. The disparity in human capital endowment is partially alleviated by R&D partnerships within the context of INTERREG and H2020, however, eastern regions of the CE area are still far from being well-integrated in the R&D networks of the area, and their innovation output is still lagging behind. Notably, while **innovation** does not represent an untapped potential for the whole of Europe, it **represents an untapped potential in the CE area**: the lost potential due to unexploited innovation is estimated in 1.34% of the GDP of the entire CE area, suggesting an **absence of sustainable and long-term integration of R&D channels**.

2.1.1 Untapped potentials in innovation and manufacturing

The degree of innovation is closely linked to the level of economic specialisation and specifically to **manufacturing activities**, which constitute a fundamental economic sector as the **CE area produces around 68% of total value added in manufacturing in the whole EU**. Manufacturing activities in the CE area are driven by **hubs featuring high economic specialisation in terms of gross value-added generation, employment, and businesses in manufacturing activities**. They are in more urbanised areas and largely in northern Italy, southern Germany, and central Poland. They benefit from sizable rail freight flows between them. However, these manufacturing hubs are partly hampered by a persistent **bottleneck represented by the insufficient interlinkages between far eastern and western regions** due to issues of **transport interoperability and deficient infrastructures**.

2.2 Flow of people

2.2.1 Relevant socio-economic, institutional and cultural factors beyond cross-border mobility

In terms of demographic change and migration patterns in the CE area, urbanised regions are overall better placed than their rural or intermediary peers. Urban regions generally face higher levels of net migration and lower rates of ageing (share of individuals aged 65 years and more), particularly in more western areas). Furthermore, there is a clear East-West split, with more eastern regions facing faster ageing populations between 2014 and 2019. However, these regions also feature (on average) lower shares of the population aged 65 years and over. The more western regions generally feature significantly higher shares of the population aged 65 years and over, but also include urban areas attracting large numbers of individuals.

Even if commuting flows between Member States are rapidly increasing in the CE area¹, **the absolute number of cross-border commuters remains relatively low compared to other regions in the EU**: metropolitan areas do not attract as many cross-border commuters compared to other parts of Europe, and the **lower population density in the CE area** generates low demand for public transport.

2.2.2 Tourism and cultural heritage as drivers for mobility across the macro-region

Another key driver in the development of many European regions is tourism², **and activities related to the tourism and manufacturing sectors are key contributors to interregional flows and constitute strategic sectors in the CE area**. Despite a rich cultural and natural heritage across the area, the CE area shows a **heterogenous spatial pattern in terms of attractivity for tourists**. Regional hotspots (e.g. venues in the Austrian and Italian Alps and city destinations such as Berlin, Prague, Venice and Vienna) draw in significant volumes of domestic and international tourists, whereas large parts of the area have lower streams of tourists. In terms of inter-CE-area tourism, some countries are substantially more attractive to tourists than others³, however, **most regions in the CE area have a relatively high degree of domestic and cross-border tourism**.

2.3 Environmental hazards

2.3.1 Polarisation between urban and rural areas

The regions of the CE area are rich in landscapes, ecosystem diversity and **natural heritage**, home to many NATURA 2000 sites. However, there is a **concentrated generation of pollution** in urban and industrial centres, mostly around **northern Italy, Poland and southern Germany**, and in **regions with high artificial surface area share** (e.g. regions with high car reliance and waste generation; artificial regions with high recycling rates).

2.3.2 Role of interregional and transnational cooperation in addressing environmental challenges

In the field of environmental cooperation, **regions in the CE area are moderately well interlinked in Horizon 2020 and INTERREG partnerships**: cooperation occurs on climate change, environmental sustainability, resource use and related fields, while there are **high discrepancies in waste management**. Developing **circular economy businesses in polluting regions**⁴ would mitigate future environmental damages and would positively impact the whole functional area.

2.3.3 Heterogeneity in patterns of energy consumption and overall sustainability

The electricity and energy networks of the CE area are **country-specific and heterogeneous: some regions rely largely on fossil fuels** (particularly in the eastern regions of the CE area), **while other are highly specialised in renewables** (e.g. Czech Republic). However, the high installed capacity of non-renewables and transmission grid issues stifle large-scale renewable development: with the expansion of coordination between stakeholders⁵, the reluctance to change the traditional energy production can be counteracted. Moreover, since the development of the internal and cross-border power grids hampers progress

¹ Cavallaro, F., Dianin, A. (2019, April). Cross-border commuting in Central Europe: features, trends and policies. Transport Policy 78, 86-104. Retrieved from <https://doi.org/10.1016/j.tranpol.2019.04.008>

² European Commission (2020). Tourism. Retrieved from https://ec.europa.eu/regional_policy/en/policy/themes/tourism/ (29.09.2020)

This is especially true for in the less structurally developed regions due to significant economic spill-overs and job creation potential.

³ In the CE area, Austria, Croatia and Italy mostly benefit from the intra-EU tourism markets as they generate the majority of international overnight stays.

⁴ Characterised by low air quality, low recycling rates and soil erosion.

⁵ Namely regional actors, local governance processes, and infrastructures.

with regards to the renewable power production⁶, cross-border links can be affected by network congestion, **hampering the expansion of renewables and energy flows**. This highlights the need for practices such as network information sharing and counter-trading⁷.

Moreover, the **inefficient exploitation of “compact cities”** (avoiding sprawling developments) is causing non-negligible losses in Austria and Italy (most notably in the areas of Vienna and Milan) and overall accounts for a loss for the entire CE area of roughly 0.62% of the CE GDP. There is thus a potential in the CE area to efficiently exploit the advantages⁸ (in terms of efficient use of environmental and energy resources) coming from a compact urban form.

2.4 Accessibility and connectivity

2.4.1 Interlinkages of manufacturing hubs and role of infrastructures

Functional interlinkages amongst the most productive manufacturing hubs within the CE area highlight that shortages in overall accessibility are particularly relevant for this area: the **key bottleneck remains the split along an East/West axis**. While urban regions tend to be effectively connected, those peripheral areas somehow left behind by main economic flows, **suffer from accessibility and connectivity shortages**.

2.4.2 Strong relation between quality of infrastructures and cross-border commuting

In the CE area, as individuals generally live and work in the same region, **most commuting occurs between urbanised hubs and their surrounding regions**. In this area, commuting patterns are limited by the accessibility factor, especially in **the eastern regions where both car and rail infrastructure remain relatively weaker**. Issues of transport interoperability are particularly apparent in railway cross-border sections, such as:

- The Scandinavian Mediterranean Corridor will not achieve the rail network as planned for 2030 as bottlenecks and technical issues persist in the German and Italian sections.
- Main railway links are still missing between Austria and the Czech Republic, and bottlenecks in Slovakia, Hungary, and between Austria and Slovakia need to be addressed. Moreover, road sections for the Rhine-Danube Corridor are missing in the Czech Republic and Slovakia.
- For the Orient/East Med Corridor, missing links remain in the Czech Republic, in particular regarding inland waterways at the German/Czech border.
- Bottlenecks on railways and roads are also present at the Austrian/Slovenian border and in the Czech/Polish/Slovakian regions for the Baltic Adriatic Corridor. The port connections could also be improved in the north of Poland, Vienna, and Bratislava as well as in some Italian and one Slovenian ports.

2.4.3 Demographic and geographical features as a cause for limited integration

Another influencing factor of the degree of accessibility is the **low population density in central Europe border regions**. In addition, specific geographical features are also a key factor hindering accessibility and connectivity, as the CE area comprises a **substantial share of all mountainous regions in Europe**. This means that untapped potentials in accessibility are particularly common in these types of regions, particularly in the mountainous border regions of Austria, Germany and Italy.

⁶ Janda, K., Málek, J., & Rečka, L. (2017). Influence of renewable energy sources on transmission networks in Central Europe. *Energy Policy*, 108, 524-537.

⁷ Kunz, F., & Zerrahn, A. (2016). Coordinating cross-country congestion management: Evidence from Central Europe. *The Energy Journal*, 37(Sustainable Infrastructure Development and Cross-Border Coordination)

⁸ Examples of the advantages provided by an efficient exploitation of a compact urban form were provided by Delphi respondents: compact cities have great potential for exploiting synergies between different energy sectors, by enabling more intermittent energy sources to be integrated and by shifting from individual to centralised heating systems that are renewable energy-based, by using waste heat recovery concepts or by applying circular economy approaches.

3 Spatial development scenarios for central Europe

3.1 Modelling of the scenarios

A set of forecasts on the short-term regional costs of the COVID-19 lockdown measures has been produced to make up the foundations of the possible future scenarios for the economic, environmental and social development of the CE area:

- A “New Normality” scenario, whereby the recent effects of the COVID-19 related lockdown and their long-term effects and policy responses (e.g. Recovery Fund) are modelled in the medium term;
- A first “Integration” scenario, assuming further economic integration among CE countries;
- A second scenario of “Partial Integration”, i.e. where we assume that the integration process will slow down because of COVID-19, limiting institutional and economic interactions.

3.2 The “New normality” scenario

This scenario highlights that a major rebound from the 2020 downturn can be expected:

- In general, areas hit the hardest by the health crisis tend to significantly rebound;
- Central and eastern regions of the CE area tend to register slightly lower growth rates in the rebound period 2021-2030, but their overall economic performance remains stronger in the long run, due to the lower losses registered during the 2020 lockdown;
- Some capital cities tend to recover more quickly than second and third-tier cities (e.g. Berlin and Bucharest);
- Within the CE area, while most regions suffer minor economic losses in the initial stage of the pandemic, they tend to fare less well in its aftermath. In some areas in the CE area, all located in northern Italy, the rebound is more significant and offsets the losses accumulated in the first period. On the other hand, many regions in the south-eastern tip of Germany, Oberbayern included, are foreseen to grow faster than the average EU27 rates in the rebound period, while also suffering from minor losses in spring 2020.

Moreover, in the *New Normality* scenario, **economic disparities between CE countries experience an overall decrease**. The “*between country*” disparities decrease because the rebound is high in poorer countries, while the “*within country*” disparities increase because the **pre-COVID tendency towards concentrated development remains** (i.e. a process of economic growth whereby economic resources and productivity tend to disproportionately increase in a few areas of the countries, not homogeneously).

3.3 The integration scenarios and the role of COVID-19

The Integration scenario is based on the assumption that the process of integration in the CE area will rapidly take place, while the *Partial Integration* scenario assumes that the pandemic generates a slowdown of the integration process within the CE area by limiting institutional and economic interactions, and postponing agreements. The two integration scenarios show similar disparity trends since the slowdown of the integration process does not influence the distribution of GDP at national and regional level but rather the aggregate growth: due to a **spatially equal distribution of integration advantages, such as the increasing intensity of cooperation relations, stronger networks, and higher trust, both *between* and *within* disparities in the two integration scenarios remain rather stable**.

The **regions benefitting the most from integration are located along the borders between CE countries** (e.g. Mecklenburg-Vorpommern), **and are those that are hotspots of manufacturing activities** (e.g. north-eastern part of Italy), **or well connected through international trade networks**, (e.g. Southern Germany and Slovakia) thanks to stronger relationships among suppliers and buyers within the production chain. **Metropolitan and large cities do not seem to gain particularly from integration**.

Further integration would have a positive impact on a number of axes defining development, beyond pure economic growth. This is for instance the case of transnational cooperation in innovative activities and accessibility, which would both increase with more integration within the area, and pollution, which would decrease as the result of an increase in integration within the area.

4 Policy recommendations

A set of proposals for policy intervention has been built based on the results of the analyses and leveraging on existing cooperation patterns, transnational cooperation structures and governance mechanisms, exploiting complementarities and synergies with other EU instruments and policies (such as macro-regional strategies). These proposals for transnational policy implementation link high-level to theme-specific interventions across the four thematic fields⁹ covered in this study.

4.1 Proposals for transnational policy implementation

As shown by the analyses of the spatial dynamics and partnerships in the CE area, the functional area is characterised by visible patterns of thematic flows and interactions, as well as by territorial disparities. Considering the size and diversity of the CE area, its integration and functionality can be greatly improved by promoting synergies, including a strategic approach to the thematic areas identified as most competitive, or as untapped potentials. This includes synergies in terms of funding, but also addresses **alignment in terms of strategies and policies and an overall functional approach to the CE territory.**

In particular, **Managing Authorities** should provide incentives for synergies and joint strategic approaches, especially by involving national and regional policymakers in a systematic assessment of cross-funding opportunities. For instance, national and regional policymakers should make full use of the new cooperation instruments – and particularly the *Interregional Innovation Investment* (I3) – to enable greater cooperation between researchers, universities, SMEs and large companies across regions by activating synergies between EU, national and regional funding for industry-led innovation projects. This would enable the **scale up of innovation to** accelerate market uptake of local innovation leveraging on regional Smart Specialisation Strategies.

Notably, as Central Europe overlaps the territory of all four macro-regional strategies, **Interreg CENTRAL EUROPE is the only transnational programme bridging all four current MRS. Interreg CE could thus enable the coordination of the four MRS**, pursuing territorial integration within and outside the CE area by approaching pan-European issues (e.g. transport routes). This could be done both in the:

- planning phase, ensuring coordination when building the programme strategy;
- implementation phase, by including a ‘coordination’ criterion in the project evaluation grid.

Another key policy objective should be **avoiding the concentration of cooperation in already developed/specialised regions.** As shown by the analysis of partnerships, the participation of different typologies of regions in cooperation initiatives is uneven, due both to the reduced administrative/institutional capacity of less developed regions and of the limited concentration of assets and resources enabling them to seize and develop the benefits of cooperation. Therefore, **stakeholder engagement and capacity building** must be further supported, **to empower stakeholders in areas with lower abilities and scarce capacity to develop and implement projects.** Practical implications of this recommendation apply for example to the fields of **economic networks** and **environment and energy**. In fact, it is key to **boost knowledge sharing and technology transfer**, through the involvement of existing and new clusters of companies and research institutions: one of the possible solutions could be the support to projects which generate virtual platforms and cross-sectoral capacities in specific technological domains.

Technology transfer and knowledge sharing should be the priority also in developing tailored solutions aiming to:

- support energy transition;
- and to foster transnational cooperation to limit the negative spillovers of pollution and environmental hazards across the CE area.

⁹ Economic interactions and networks, Flow of people, Environmental hazards, Accessibility and connectivity

Facilitating the transition to “green energy” should fill the technological gap of the eastern areas of the CE, which are still heavily relying on fossil fuels. Moreover, specific transnational cooperation projects could promote the definition of a common waste management strategy, with concrete lines of action to achieve improvements in the consumption of non-renewable resources, promoting a circular economy approach in companies.

As far as a balanced territorial coverage in transnational cooperation is concerned, given the unequal distribution of infrastructure and different level of maintenance, investing in **accessibility** via infrastructural transport projects is also a key policy recommendation. National authorities – which are often responsible for the design and implementation of major infrastructures – should adopt an integrated approach focused on the needs of the functional area: this would leverage the strategic value of each national infrastructure, as its integration in a wider network would enhance their contribution to the overall accessibility and connectivity of CE. For instance, adding **new criteria in project appraisal** – which tend to favour high demand - may **tackle inequality in public transport provision in low-density areas**. Introducing “equity” as a horizontal principle in transport policies should somehow offset other criteria based on project efficiency (such as Cost-Benefit Analysis).

Flows of people are impacted as well by the highly unequal distribution in the human capital pattern around the CE area. An East-West split is indeed observed in demographic and migratory patterns: eastern regions are largely less densely populated, generally feature lower rates of net migration and are experiencing an increase of the share of the population above 65 years of age which is generally higher than in western regions. Central Europe is also a heterogeneous area in terms of tourism and cultural heritage despite a relatively high degree of domestic and cross-border tourism. Since tourism is a strategic driver for economic development a key policy objective is the **promotion of less mainstream destination** through **communication strategies** to “**uncover**” **hidden tourism honeypots** (i.e. destinations that are likely to be unique due to the specific niche of activities they can offer), and to boost tourism in minor touristic spots. Moreover, policymakers should focus on favouring the generation of an adequate “**critical mass**” of **qualified human capital in the East**, as this is one of the key mechanisms for improving innovation output, and eventually economic growth.

Finally, while descriptive data on the CE development is relatively accessible, data depicting functional relations, flows and interactions, is not easily accessible at a detailed level. Thus, **improve the knowledge base and territorial evidence on functional relations in CE** should bring benefits to cooperation in the relevant area. Indeed, this would increase awareness amongst stakeholders on the features and potentials of the functional area. To achieve this, policy makers should focus on promoting the development of urban datasets and smart indicators at local/regional level as well as collecting data and information on interactions and flows for a better and more informed decision-making process.



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