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Commentary

European Border Regions: Opportunities and Obstacles for Cross-Border Interaction

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Introduction

The fall of the Berlin Wall in 1989 marked not only the end of a tragic socialist experiment. All of a sudden, the frontier to which Winston Churchill had given the name of the Iron Curtain, and which had prevented contacts and exchanges between Western and Eastern Europe for nearly half a century, was demolished. The collapse of the Wall gave fresh nourishment to the vision of a Europe without frontiers.

During the years which have passed since 1989 the vision has lost some of its luster. The integration of Western and Eastern Europe has advanced, but many differences remain. Nevertheless, there is continued optimism in the EU - and the West European countries which have elected to stay outside it - concerning the opportunities for cross-border cooperation, both within the EU and across the EU's external borders. The Interreg programs, which embrace a number of border regions, mainly within the EU but also in adjoining countries, are giving backing to cooperation in an attempt to strengthen the competitiveness of regions which are peripheral in a national perspective but may in a borderless perspective find themselves cast in a different role from the one allotted to them by national relationships. Discussions on EU cross-border cooperation increasingly highlight the importance of governance quality. Recent frameworks evaluate how governance, cooperation, and integration reinforce one another, a perspective that helps to assess the effectiveness of EU-funded programs such as Interreg (Wong Villanueva et al., 2022).

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This paper discusses general opportunities and obstacles for cross-border interaction in Europe. Section 2 discusses the impact of borders on economic interaction and development. Section 3 treats border-regional cooperation versus cooperation in networks across space. The main section, respectively section 4, presents a taxonomy on interaction costs as a measure of the importance of border obstacles. Section 5 gives some concluding remarks.

1. Borders and economic interaction and development

In theory, and in ceremonial academic speeches, scholars are free to formulate for themselves the problems they investigate, but in practice, they adapt themselves in high degree to what is in demand. This seems to be the only feasible explanation of the fact that until the EU began to discuss the abolition of practical border obstacles in the mid-1980s, the studies of border regions were extremely easy to count, whereas during the 1990s this field of research became one of the fastest-growing topics at European regional research conferences. More recent analyses, however, suggest that despite this long trajectory of scholarly engagement, the field still lacks a comprehensive theory of cross-border integration and continues to rely heavily on case-study-driven approaches (Wróblewski, 2022). At the same time, cross-border cooperation has evolved into a core pillar of EU regional policy, drawing increasing attention to how institutional configurations, structural disparities, and regional asymmetries shape the outcomes of cooperation across Europe (Fogarasi, 2024). Emerging perspectives further emphasize that cross-border cooperation cannot be fully understood without examining the governance structures that sustain it. A systems-based approach highlights the dynamic, mutually reinforcing relationship between cooperation and integration, underscoring the necessity of effective, multi-level governance arrangements for long-term cross-border collaboration (Wong Villanueva et al., 2022). Building on this expanding body of work, it remains evident that national borders continue to constitute a central object of analysis due to the various obstacles they present.

Against this background it is natural that border-regional research has concentrated chiefly on national borders and the various types of obstacles which these constitute. Without anticipating the presentation which follows it ought to be pointed out that national borders are only one case of a type of boundary which can be designated as *administrative*. This group also includes official administrative boundaries within states as well as administrative boundaries of non-geographical character. One example may be said to be to be the boundary between market production and production for own use represented by a firm (cf. Coase, 1937). Alongside this group, other kinds of boundaries can be distinguished, e.g. *cultural, linguistic, religious, geographical, economic-structural* and *infrastructural*. The spatial

distribution of the various boundary-types coincides in many instances, but far from always.

In certain cases, the boundaries are quite as palpable as a national border while in others they are more diffuse, e.g. in economic-structural contexts. Each and every one of the various boundary-types marks the existence of one or more boundary-obstacles obstructing interaction across the boundary.

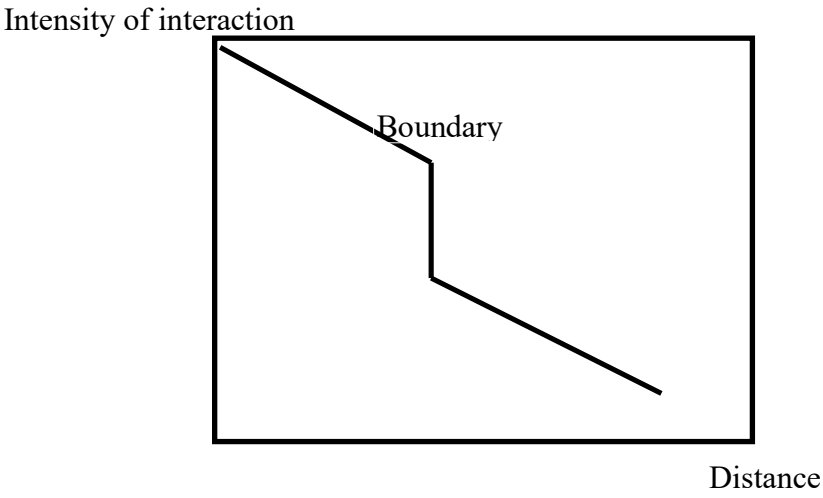

Figure 1. Relationship between interaction intensity and distance, with a boundary of some kind
Source: authors

Generally speaking, boundaries may be said to have two distinct effects. On the one hand, they restrict the various network flows in one or more directions, which has an inhibiting effect on economic and other interaction across the boundaries (Karlsson, 1994). Every discontinuity in the various flows therefore indicates the presence of a boundary (Nijkamp, Rietveld & Salomon, 1990). Figure 1 shows how the intensity of interaction, which normally diminishes continually with distance, is sharply reduced by the presence of a boundary.

If boundaries restrict network flows in this way, causing discontinuities in them at a certain point, it can be argued on the other hand that in many cases boundaries *increase* network flows *within* the zone that includes the boundary and that this effect will be stronger the more and "higher" the boundary-obstacles marked by the boundary. One reason may be that the boundary conduces to low, equalized interaction costs within the area so demarcated. Another reason may be that if cross-boundary links of a (potential) network are restricted or do not come into existence at all, the pressure on other links, within the area so marked off, becomes greater. However, this presupposes that the aggregate interaction within the network is unchanged or at any rate not repressed so severely by the boundary

that the flows within the demarcated area are less than they would be without the boundary. Figures 2 and 3 show these two types of case graphically.

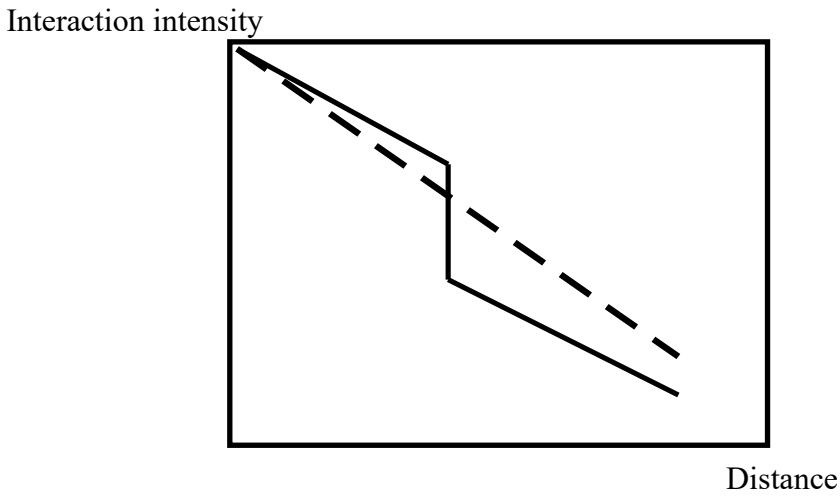

Figure 2. Example of how the boundary increases interaction intensity in a demarcated area (left-hand part of the continuous line) compared with interaction intensity in the same area without a boundary (dashed line)
Source: authors

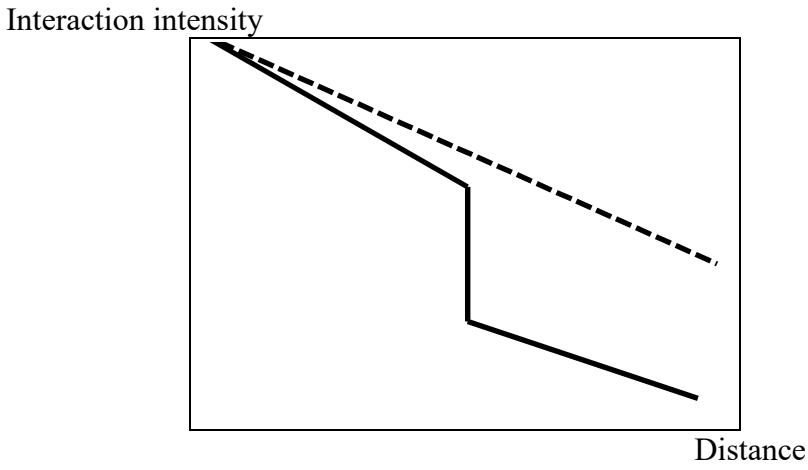

Figure 3. Example of how the boundary has such an inhibiting effect on (potential) network flows that the interaction intensity in a demarcated area (left-hand part of the continuous line) is lower than it would be without a boundary (dashed line)
Source: authors

From this perspective the intensified drive for integration which has characterized the EU since the middle of the 1980s can be described as resulting from a shift of perception on the part of member countries, so that, having previously judged their situation to correspond to Figure 2, they now consider it to be more in accordance with Figure 3. The reason for this change of attitude is probably to be found in the profound social changes which have characterized the Western world since 1970, with increasing globalization, forced on by new technology and coinciding with a severe decline of the nationally-linked parts of the industrial sector. Whereas national borders had formerly been thought to be means of stable national growth, during the 1980s they came to be perceived increasingly as preservers of stagnation and hindrances to improved competitiveness in international markets. In step with this change of attitude, the dismantling of border obstacles has been regarded as a method of making possible what Dahmén (1970) called "new combinations of factors of production" and, not least, of generating productivity profits as a consequence of increased competition (Cecchini, 1988).

2. Border-regional cooperation *versus* network cooperation

In this paper, the term "border region" means regions that have a land border with another country. Regions which are partially demarcated by the sea, however, are normally not defined as border regions. It is reasonable to maintain this distinction, with certain exceptions. The exceptions will consist mainly of regions separated by straits but not by major areas of sea. Accordingly, the Copenhagen region of Denmark and Scania (Skåne) in southern Sweden, which are separated by the narrows of the Sound, ought to be defined as a border region.

Border-regional cooperation in Europe is not a new phenomenon, but it is plain that a dramatic increase, both qualitatively and quantitatively, has taken place since1990s (Javakhishvili-Larsen, 2022; Javakhishvili-Larsen et al. 2018). This applies both to the EU- subsidized Interreg programs inaugurated in 1990 and to the collaborative projects between regions on both sides of the former iron curtain. The driving forces behind these forms of collaboration have been both economic and political. Contemporary scholarship shows that the intensity and forms of cross-border cooperation vary substantially across Europe, influenced not only by geographical proximity but also by political, cultural, and institutional conditions. Typologies developed in the literature demonstrate that cross-border interaction is deeply conditioned by differences in governance capacity, administrative compatibility, socio-cultural linkages, and institutional environments, the factors that help explain why some border regions achieve more sustained and profound collaboration than others (Wróblewski, 2022). Empirical studies further underscore the central role of institutional environments in shaping the depth, continuity, and

effectiveness of cooperation, revealing how variations in institutional thickness, compatibility, and maturity influence both the scope and resilience of cross-border initiatives (Javakhishvili-Larsen, 2022; Javakhishvili-Larsen et al., 2018). Complementing these findings, comparative research highlights that cross-border cooperation manifests in multiple forms, ranging from highly institutionalized arrangements supported by formal governance structures to more informal, vernacular practices embedded in everyday border life, demonstrating the diversity and adaptability of cross-border interaction across different regional contexts (Golunov & Bitabar, 2025). As also highlighted in Fogarasi (2024), CBC initiatives vary widely in their degree of institutionalization, with some driven by long-term governance structures and others emerging primarily in response to EU funding incentives.

Another form of collaboration has increased very vigorously alongside border-regional interaction, viz. *networks between regions,* which do not adjoin one another but may be located in entirely different parts of Europe. By comparison with interaction between border regions, network cooperation may be concentrated on fewer issues, perhaps only a single one (Westlund, 1999; Westlund & Johansson, 1997; Mlinar, 1996).

The two forms of cooperation are reflections of the influence of space on human activities. The interaction between regions on different sides of national borders which at present is enjoying strong growth is a variant of the interaction which also occurs between neighboring regions within a country and which, historically speaking, led to the enlargement of functional regions and to amalgamation of several regions into one. It is improved transport facilities, along with the dismantling of administrative border obstacles, that have made this process possible in the countries concerned, caused the towns to enlarge their trading areas, and united large expanses of these trading areas with the town to form functional urban regions. The spatial interaction between town and country has changed step by step into spatial integration - an integration founded on spatial enlargement of the influence of towns and embracing both economic, social and cultural conditions.

Interaction in networks is based on factors other than spatial proximity.[2] To begin with, networks are often constructed only for cooperation centered upon one or a few specific functions. This - sometimes extreme - specialization makes the networks independent of distance to a certain extent and constitutes the explanation of the fact that their links may connect nodes far distant from one another. At the same time, this network specialization implies a large measure of uncertainty as

[2] Johansson, Karlsson and Westin (eds.) (1994) contains a relatively broad overview of networks for various types of interaction

regards continuity, in comparison with the numerous wide areas of cooperation which often characterize the interaction between regions in close proximity to one another. Networks are dissolved and re-formed, while the functional regions exhibit considerable inertia and as a rule are changed only in accordance with long-term trends.

This distinction, between extensive interaction of neighboring/border regions with one another on the one hand and specialized network cooperation between spatially separate nodes on the other, may be regarded as a basic starting point for elaboration of the regional development strategies which, in principle, stand on the agenda for every European region. Cooperation between neighboring regions - in the same country or on opposite sides of a national border - requires one type of strategy and poses certain vital questions. Network interaction between spatially separate regions requires quite a different strategy and puts quite different questions at the top of the agenda. In the former case it is often a matter of fostering a broad spectrum of cooperation in different areas whose growth in the long run leads to *integration* of the regions in functional respects. In the latter case, cooperation in so many areas of activity that a functionally integrated region emerges is inconceivable. A deliberate strategy of encouraging network interaction between spatially separate regions ought therefore to be focused on a few relatively distance-independent spheres of cooperation in order to be fruitful.

The distinction between neighboring/border regions and spatially separate regions may be thought simple in theory. In practice, however, problems of definition may arise which crucially affect the choice of strategy. For natural geographical or other reasons, two (or more) regions adjoining one another may have their population centers at a proper distance from one another while the zone around the border is virtually uninhabited. In such a case are the prerequisites in place for the broad cooperation which is possible in densely populated border areas, or should a strategy for network cooperation between the distance-separated urban regions be selected?

3. Interaction costs as a measure of the importance of border obstacles

Interaction costs and their differing potentials for change[3]

According to economic terminology, all activities are associated with some kind of cost. Borders may be said to mark special types of costs which have effects on the extent of interaction across borders.

The definitions of different types of cost concept are far from uniform. *Transaction cost* is a term frequently used to denote those costs which are not directly linked to production (cf. e.g. Andersson, 1995). However, there are many contexts

[3] This section is based on Westlund (1999)

in which the concept of transaction costs is kept distinct from *transport costs*, being reserved mainly for negotiation and contract costs. *Transfer costs* are usually defined as the sum of transaction costs and transport costs, thus being distinguished from *production and development costs*. The sum of transfer, production and development costs has been denominated as *supply costs* by Johansson and Westin (1994).

In a strict economic analysis, these are relevant and serviceable definitions. However, in an analysis that also embraces non-economic aspects of border-regional cooperation, a more general expression than supply costs ought to be used. Since exchange in various forms can be summed up in the expression interaction, the term *interaction costs* is proposed here as a summarizing term for costs associated with cross-border cooperation.

Building on this broader conceptualization of interaction costs, recent research highlights how these costs are shaped not only by economic factors but also by administrative, institutional, and socio-cognitive conditions. Empirical assessments of cross-border cooperation (CBC) show that administrative inefficiencies, cognitive distances, and uneven governance capacities frequently elevate interaction costs and constrain the long-term sustainability of cooperation (Fogarasi, 2024). Moreover, several studies point out that many foundational determinants of cross-border integration remain insufficiently addressed, particularly the complex institutional arrangements that influence both the magnitude and the distribution of interaction costs (Wróblewski, 2022). Governance structures play an especially crucial role: coherent and well-aligned institutional frameworks tend to reduce political-administrative frictions and facilitate more effective interaction across borders (Wong Villanueva et al., 2022). At the same time, comparative research shows that cross-border collaboration can also emerge in less favorable political contexts, as local actors often develop informal or vernacular forms of cooperation that bypass formal barriers and adapt flexibly to institutional constraints (Golunov & Bitabar, 2025).

Interaction costs consist of a number of different component costs generated by a number of different factors. In Table 1, a group of such factors are deployed according to potential for change from rapid to very slow.

Technical-logistical factors as interaction costs

Following Table 1, the technical-logistical factors is the group showing the most rapid change. The rapid developments of information and communication technology (ICT) since the 1980s is an example of this. However, the relative importance of technical-logistical factors has varied over time. The relative technical-logistical costs develop differently for different sectors and result in relative price changes, market changes and pressure for change on other factors generating interaction costs.

In a spatial context, the most important impact of these factors is that their effects differ between regions. Taking high-speed trains as an example, they require big cities within a certain distance to be competitive, while the market for them is too small in small and medium sized cities and the countryside. On the other hand, the car suites the countryside better, as the countryside benefit from the advantages but avoid the traffic-congestion that falls upon the metropolitan cities. Another contrasting example is the rapid expansion of telecommunications technology, based on very low threshold values (possession of a cell phone and/or mobile or Wi-Fi networks) for accessing the internet. Thus, the technical-logistical development is not neutral in a spatial context, since the prerequisites for taking advantage of the development differ between region types.

Some vital factors of this kind are population size and the density and distribution of population. One of the achievements of the central-place theory was that it demonstrated that there is a proportional relationship, *ceteris paribus*, between the population of functional regions and the degree of diversification of the supply of services. In other words, there are, in principle, threshold values for every type of production selling its wares in the local/regional market, but these threshold values may be lowered by means of subsidies or other defrayals of cost outside the market. In technical-logistical respects this means that certain interaction-reinforcing applications only come about in regions where the market potential is large, while other applications are disseminated rapidly even in markets which are small and sparse in terms of population.

Table 1. Factors which generate interaction costs in and between networks, grouped by potential for change.

Rapid				**Very slow**
Technical-Logistical	**Political-Administrative**	**Economic-Structural**	**Cultural-Historical**	**Geographical and Biological**
-Costs of production and transport of goods	-National/regional rules and regulations for goods and services	-Economic development level/demand patterns	-Language	-Physical distance
-Costs of transport of persons	-Customs duties, etc.	-Economic structure	-Religion	-Geographical obstacles (e.g. rivers)
-Costs of capital and capital transfer	-Tariff zones	-Educational level	-Mentality	-Time zones
-Costs of information and information transfer		-Compatibility and standard of infrastructure	-Ethnicity	-Human biology
			-Population density	
			-Power structure and property rights	

Source: The table was first published in Westlund (1999) and is inspired by Nijkamp et al. (1990)

Political-administrative factors

Political and administrative changes have, over time, produced markedly different effects at different spatial scales. While barriers have been removed at one level, new ones have often emerged at another. In antiquity, the Roman Empire functioned in many respects like a modern union. Its collapse in the West initiated a prolonged era of political fragmentation and regionalization in Europe, with the Carolingian Empire representing only a short-lived interruption of this broader trend. During the Middle Ages, the Hanseatic League and the Italian maritime city-states managed to maintain cohesion among these fragmented regions, largely due to advances in transport and the emergence of credit systems. These trading networks were based on a narrow range of commodities, which helps explain both their rapid growth and their inability to evolve into more formal political or administrative entities. Only with the emergence of nation states were internal political and administrative barriers within territories largely dismantled. At the same time, however, new obstacles arose between states, contributing significantly to the decline of the Hanseatic League, as territorially based power structures ultimately prevailed over loosely organized networks.

The formation of nation states itself was enabled by technical and logistical progress in military organization and public administration. These advances also established the institutional and market conditions that supported the gradual transition to industrialization, a transformation that earlier trading networks had not been able to achieve to the same extent. Initially developed as a reaction against mercantilist regulation, economic nationalism later became a major impediment to economic development. The period of European free trade that accompanied the decisive phase of industrialization in the late nineteenth century was relatively short-lived, giving way to rising protectionism as domestic agriculture and industry increasingly faced international competition.

Abolition of the political and administrative barriers to interaction has been central to the European Union. The introduction of the four freedoms in 1992, along with adoption of the Maastricht treaty and the EMU, means that the vast majority of political-administrative interaction obstacles controlled by national states has vanished in the EU.

Economic-structural factors

Economic-structural interaction costs can be illuminated through trade theory and the concept of comparative advantage, which has deep roots in both trade and regional economics. Ricardo's initial formulation was later extended by Heckscher and Ohlin (Ohlin 1933) into a general theory explaining trade as a result of differences in countries' relative endowments of production factors. A central limitation of classical trade theory, however, is its exclusive focus on supply, largely ignoring demand and its evolution. Burenstam Linder (1961) addressed this shortcoming by incorporating

income and demand-side considerations, showing that trade intensity tends to increase with similarities in income and capital levels—an observation that lay outside the explanatory scope of factor-proportions theory. Subsequent developments in trade theory, particularly the assumption of product differentiation rather than homogeneity, have been crucial in explaining intra-industry trade and other phenomena left unexplained by classical models. Other economic-structural factors, such as education levels and infrastructure quality and compatibility, are closely related to these more recent theoretical advances.

From a network perspective, even the Heckscher–Ohlin framework implicitly assumes hierarchical production networks in which connections are determined by relative labor and capital costs at different nodes. In this respect, it shares underlying assumptions with Christaller's (1933) central-place theory, notably the idea that locations at the same hierarchical level and with similar structures have little incentive to interact. Direct links between such nodes therefore sit uneasily within both theoretical frameworks.

One might argue that classical trade theory sought to explain uniform flows between dissimilar nodes, while modern theory focuses on diverse flows among similar nodes. However, this characterization oversimplifies the evolution of trade theory and does not fully capture its complexity.

A fundamental weakness common to both classical trade theory and central-place theory lies in their implicit network assumptions. By treating nodes at the same hierarchical level as homogeneous and assuming homogeneous products, both theories overlook the substantial heterogeneity that exists in practice. While simplification is inevitable in theory-building, the assumption of homogeneity in one dimension obscures diversity in many others. Even countries with broadly similar economic structures differ significantly at more detailed levels, and places occupying comparable positions in the urban hierarchy may share certain functions while diverging sharply in other economic characteristics. It is precisely this combination of shared and distinct features that enables network formation. If nodes were either entirely identical or entirely unrelated, networks could not emerge. Because homogeneity is assumed where it is in fact only partial, both theories overextend their explanatory reach and come into conflict with observed realities.

The limitations of classical trade theory can also be linked to the historically determined degree of economic diversification and to outdated statistical classifications of production and trade. Standardization and mass production during industrialization made the assumption of homogeneous products appear reasonable. Over time, however, the proliferation of products and the growing emphasis on customization have far outpaced statistical systems rooted in nineteenth-century raw-material classifications. Product homogeneity thus exists mainly in statistical representations. The apparent paradox of intra-industry trade reflects a conceptual

reliance on obsolete industrial categories rather than any real anomaly in trade patterns.

Seen in this light, economic development can be described as a transition from sparse and coarse trade networks to increasingly dense, specialized, and finely differentiated ones. The expansion of intra-industry trade simply mirrors the proliferation of networks as economic actors seek to reduce interaction costs.

Within a network framework, "comparative costs" represent the most efficient combination of interaction costs available to a given region. A region's strongest comparative advantages lie in products that combine high quality with low costs across relevant factors. Unlike simple factor-proportions theory, this perspective recognizes that comparative advantage is shaped by a wide range of interaction costs, not just labor and capital. All categories of interaction costs identified in Table 1 influence regional advantages and disadvantages. Product-cycle theory further illustrates that comparative advantages are generally temporary, as input requirements evolve over a product's life cycle. However, comparative advantages associated with broader product types—such as labor-intensive or knowledge-intensive goods—may persist if they are closely linked to enduring input characteristics.

In Table 1, economic-structural factors occupy an intermediate position in terms of their potential rate of change. In the short run, economic structures can be treated as relatively fixed, but over longer periods they are subject to profound transformation. The preceding discussion has treated trade flows primarily as passive outcomes of regional affinities. A more dynamic analysis would examine how product flows themselves reshape both internal and external regional linkages, providing a richer understanding of economic-structural interaction costs and their evolution.

Cross-border exchanges can, in principle, be stimulated through two opposing mechanisms. Classical trade theory emphasizes regional *differences* as the primary drivers of exchange, whereas modern trade theory explains the growth of intra-industry trade by highlighting *similarities* in economic development, structure, and income levels as key facilitators of interaction.

Cultural-historical factors

Cultural and historical barriers to interaction have accumulated over centuries, or even millennia, of limited contact and mutual friction. Features such as language, religion, and collective mentalities often emerged under conditions of low interaction frequency. From the standpoint of interaction costs, these cultural forms can be understood as historically rational responses to economic and social needs. Internal interaction costs were minimized through integration into groups that eventually became tribes and nations with shared cultures, while external interaction costs remained high and often increased as internal cohesion strengthened. As long as societies were largely self-sufficient, low internal costs outweighed high external ones.

With economic development and expanding spatial ambitions, tensions arose between these cost structures. Historically, such tensions were resolved through warfare, conquest, and forced assimilation. Only in the post–Second World War era have voluntary international economic organizations and the gradual emergence of a common global language alongside national ones begun to take hold.

Although central-place theory can be criticized for overemphasizing hierarchical structures and rigid functional levels, its focus on population size as a foundation for economic diversification remains influential. Where local or regional markets lack sufficient population, they cannot sustain certain activities. At any given stage of development, population size—not just human capital—constitutes the most critical resource underpinning a wide range of economic activities, particularly in services.

Before industrialization, population density was largely determined by agricultural productivity at the local or regional level. Since the industrial revolution, two major shifts have occurred: large-scale emigration to North America and the onset of urbanization, which was partly national but primarily regional in nature. As a result, Europe's regional population distribution still closely resembles its pre-industrial agrarian pattern. North America also reflects agricultural influences, but its settlement pattern is less constrained by them because industrial-era migration occurred after migrants had severed ties with their regions of origin. Despite higher mobility in North America, the population distribution established during industrialization has proved remarkably persistent.

Population distribution is therefore a highly resistant factor. As an interaction barrier, its main effect lies in shaping differences in economic diversification. Densely populated, diversified regions tend to interact more with one another than with sparsely populated areas, which also tend to have fewer interactions among themselves. Gravity models are commonly used to analyses such patterns. Within the interaction-cost framework employed here, it is important to stress that population density alone explains gravitational effects in some networks, while in others different factors or combinations of factors dominate.

This reasoning aligns with the spatial dynamics of the product cycle. New firms and organizations are typically established in densely populated areas with strong demand potential, and their networks initially focus on similar regions. As products become standardized, these patterns shift, enabling greater interaction with peripheral and less densely populated regions—provided these regions meet the necessary technical and educational requirements. In early stages of the product cycle, internal links among complex spatial nodes are most significant, whereas in later stages external connections become increasingly decisive.

Power structures and property rights constitute another crucial set of cultural-historical barriers to interaction. Economic historians such as North and Thomas

(1981), North (1973), and Rosenberg and Birdzell (1986) have argued that the Industrial Revolution occurred in the Western world because late medieval power-sharing arrangements among the crown, nobility, church, and bourgeoisie produced property rights conducive to economic change. In contrast, absolutist systems in Asia, despite high cultural development, lacked such rights, preventing capitalist industrialization. In Western Europe, power was divided not only socially but also spatially, limiting the ability of elites to suppress emerging capitalist forces. In Asia, by contrast, centralized authority controlled economic activity at all levels, leaving successful merchants vulnerable to expropriation.

Today, organized crime and weak property rights are widely regarded as major barriers to economic progress. Criminal structures operating above the legal system raise interaction costs and inhibit economic activity. These examples demonstrate that property rights depend not only on legislation but also on social acceptance and enforcement—on the strength of civil society itself. As such, property rights represent a deeply rooted cultural-historical issue rather than merely a political-administrative one.

Beyond historical and legal perspectives, development economists—from Myrdal (1957) and Hirschman (1958) to dependency theorists such as Cardoso and Faletto (1979)—have also stressed the importance of spatial power distributions and property rights in shaping economic polarization or convergence. Whether a dominant center becomes an isolated enclave or a catalyst for broader development largely depends on existing power and property-rights arrangements. Where these are spatially concentrated, the conditions necessary for reducing polarization and fostering new forms of exchange are unlikely to emerge.

Settlement patterns and population density are historically determined and highly resistant to change. At the regional level, Europe's settlement structure still largely reflects pre-industrial occupational conditions shaped by climate and soil quality. These factors determined how many people could be supported by agriculture and fishing and how much surplus could be extracted. Industrialization led to urban growth, but this primarily involved redistribution of population within regions rather than large-scale interregional shifts.

There are, however, notable exceptions. Capital cities have tended to grow more rapidly over time due to concentrated political power, and regions rich in natural resources have experienced rapid industrial expansion. In many countries, certain towns have also evolved into major centers serving not only their immediate hinterlands but broader parts of the national territory.

Geographical and biological factors

The final group of factors shown in Table 1 consists of geographical and biological constraints, including administratively mediated geographical barriers such as time zones. Changes in geographical conditions occur extremely slowly, apart from

sudden natural disasters. Human influence over these barriers—directly and indirectly—has increased alongside technological development. Advances in infrastructure above, on, and below the Earth's surface have greatly reduced the significance of geographical obstacles. Physical features such as mountains, rivers, and oceans remain unchanged, but their constraining effects have been substantially diminished by technology.

Equally resistant are biological constraints associated with human physiology. Hägerstrand's (1981) concept of time geography emphasizes that daily rhythms and biological limits impose absolute constraints that transcend economic cost considerations. Ultimately, human capacities themselves represent the final boundary to the elimination of interaction costs.

Natural geographical conditions are no longer problems impeding population growth. For a long time, the tendency has been for access to markets and labor to take the place of access to raw materials as the most important location factor (Westlund and Borseková 2025). This means that the interaction obstacles presented by sparse population were formerly caused by natural geographical factors but are now virtually a product of cultural-historical factors.

The development of information and telecommunications technology has meant that the natural geographical obstacles have disappeared in many sectors of the market. Opportunities for interaction, external as well as internal interaction, have increased dramatically for these activities.

Concluding remarks

An assessment of the above-discussed obstacles to interaction across different types of borders may be regarded as an initial way of approaching the problem of opportunities for cross-border cooperation. A collected estimate of potential interaction across a border requires an analysis of the strength of the various types of obstacles summarized in Table 1 in each unique case. Strategies for increasing interaction across a border require not merely an assessment of the general potential for change of various obstacles as shown in Table 1, but also an assessment of the potential for change a) under the specific conditions which exist in the border regions, and b) related to current technical and social developments. Certain factors have a comparatively even pace of change while others evolve at irregular intervals during certain periods, thereafter remaining unchanged for a long time. The transport infrastructure is a clear example of the latter case.

In this context, institutional conditions become a crucial lens through which the interaction potential of border regions can be understood. Empirical evidence shows that "thick" institutional collaboration, characterized by dense networks of organizations, shared strategic frameworks, and stable cross-border partnerships, can

strengthen cross-border affinity by reducing coordination frictions and enhancing joint problem-solving capacities (Javakhishvili-Larsen, 2022; Javakhishvili-Larsen et al., 2018). The degree of institutional alignment across borders similarly shapes how effectively regions can respond to the obstacles outlined above, as coherent multi-level governance structures tend to mitigate administrative barriers and promote more durable forms of cooperation (Wong Villanueva et al., 2022). These findings reinforce the broader insight that cross-border interaction depends on a delicate balance between similarities and differences: regions must share enough institutional and cultural common ground to cooperate effectively, while still possessing complementary political, economic, or social characteristics that make collaboration meaningful (Wróblewski, 2022).

However, the question is whether it is possible to sum up the interaction potential between two regions at a given point in time in any summarizing measure, i.e. whether an analysis based on the factors described above can be lifted to a more general level. Such a change of analysis level requires supplementary analytical tools. In addition to an analysis of the obstacles, a supply and demand analysis is required in respect of those products and resources (goods, services and information for public or private consumption) upon which the potential interaction may be thought to bear. The concepts of homogeneity and heterogeneity respectively become of central importance to the analysis here.

Interaction between regions is based on their not being homogeneous, ie identical. An exchange between completely identical regions would by definition incur a cost of exchange but produce no income in the form of inflows of anything of which the respective regions had a relative shortage. Without heterogeneous attributes the regions would lack any relative surplus or deficit of different factors and therefore would have no reason either to give or to receive flows of products and resources.

On the other hand, it may be argued that without homogeneous qualities the regions would have no common denominator and grounds for interaction would be lacking. So a key conclusion from the discussion of interaction obstacles is that dissimilarities, i.e. heterogeneity between regions, also have inhibiting effects on the interaction potential. Interaction between regions consists of the flows of factors of which the one region has a relative surplus while the other has a relative shortage. As long as the aggregate return exceeds the costs of the flows, interaction will continue.

This argument can lead to a hypothesis to the effect that cross-border interaction probably requires regions to have a specific combination of homogeneous and heterogeneous attributes in order to occur and persist. In the extreme cases, i.e. of total homogeneity or total heterogeneity of regions, no interaction can take place. It might be possible to use the concept of affinity (cf. Johansson and Westin 1994) as a denomination of the degree of optimal combination of homogeneity and heterogeneity of regions.

Building on this hypothesis, regional affinity can be understood as the outcome of a particular balance between homogeneity and heterogeneity, too little common ground limits the formation of shared institutional or cultural frameworks, while too much similarity reduces the incentives for exchange or complementarity. Contemporary research shows that this affinity is further shaped by the marked heterogeneity among European border regions, including the East-West and Old-New Member State asymmetries that influence both the motivations for cooperation and the capacities available to sustain it (Fogarasi, 2024). At the same time, comparative studies highlight that affinity is not determined solely by formal institutional structures. It can also emerge through bottom-up practices, informal networks, and vernacular forms of cross-border collaboration that take shape independently of high-level political alignment, enabling interaction even in contexts where institutional convergence is limited (Golunov & Bitabar, 2025). Taken together, these insights illustrate that cross-border affinity is a dynamic construct, shaped by the interplay of structural asymmetries, shared cultural or institutional features, and locally driven forms of cooperation.

The weakening of the nation-state seems to be a reality, at least in Western Europe. Satellite TV and the Internet have brought a dramatic augmentation of the cross-border supply of information and opportunities for contact cutting across the existing national hierarchies. It is also probable that the global shift of production away from similar standardized products and towards customized products will change the importance of size in local/regional market thresholds.

For border regions, these evolutionary tendencies imply lowered barriers and therefore opportunities for increased interaction. But it should be underlined that this does not apply only to exchanges between regions directly adjacent to one another. The tendencies here cited increase above all the opportunities for interaction in networks that are more or less independent of distance. Thus, they do not imply any special advantages for regions which adjoin one another. The changes which are in progress may be more likely to weaken the importance of distance as a factor underlying interaction - and yet a key factor in the hypothesis of increased interaction between adjacent regions is the importance of distance.

For border regions, these broader evolutionary tendencies imply a general lowering of barriers and a widening of opportunities for interaction. However, these shifts do not apply solely to neighbouring regions. The rise of network-based forms of cooperation increasingly enables interaction that is only weakly dependent on geographical proximity, thereby reducing the inherent advantages traditionally associated with adjacent locations. As a result, the importance of distance as a determining factor in cross-border interaction appears to be weakening, even though many earlier hypotheses about enhanced cooperation between neighbouring regions were predicated precisely on distance playing a central role. Comparative research

further indicates that these dynamics are not unique to Europe but reflect wider global transformations in cross-border collaboration, where interaction often unfolds within multi-scalar, partially deterritorialized networks (Golunov & Bitabar, 2025). At the same time, varying development trajectories across European border regions underscore the continued influence of structural disparities and uneven capacities in governance and institutions in shaping the extent to which these new opportunities can be realized (Fogarasi, 2024, Borseková et al. 2025).

These concluding comments show clearly the need for more detailed research into the spatial effects of the current processes in Europe. One hypothesis taking the results of this paper as its starting point might be that three distinct developmental tendencies are at work among the European border regions:

a) A small number of frontier regions with large populations and separated by natural geographical obstacles can receive powerful dynamic impulses via a bridge or tunnel.

b. A number of border regions in the most densely-populated parts of the EU may, despite the language problem, come to be developed into integrated labor market regions.

c. The majority of border regions having small formal frontier obstacles, will probably experience considerably more expansion of exchange in global networks than intensification of their internal integration.

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No potential conflict of interest was reported by the authors.

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