



# Borders as opportunities in the space-economy: towards a theory of enabling space

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Received: 5 June 2020 / Accepted: 12 January 2021 / Published online: 7 February 2021  
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## Abstract

This paper posits that regional science—as a multidisciplinary analysis of the functioning of regions—has, in its historical evolution, largely neglected the specific role of borders. Borders do not only act as barriers with friction costs in an otherwise open human interaction space; they are multidimensional organizing principles for mobility, interaction, location, and socio-cultural identities of areas. The existence of borders does therefore not necessarily mean exclusively the existence of costly impedance and transaction frictions. Starting from a historical sketch of focal points in regional science, the paper seeks to develop the contours of a new conceptualisation of *enabling space* in which borders may be seen as opportunities for innovative development in a cross-border space-economy. Amartya Sen’s capability theory will be used as a cornerstone for a novel interpretation of borders to be used by smart and alert actors as a challenging and promising portfolio of cooperative development strategies for people, business agents, and spatial cohesion policy. This study concludes that borders—in case of a sufficient degree of permeability—may generate smart opportunities for the regions involved.

**Keywords** Border · Spatial opportunity · Capability theory · Enabling space · Resourceful region · Borderless world · Euregio

## 1 Regional science: a cross-border platform for the space-economy

“Good Fences Make Good Neighbours”

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In the Index of the *Handbook of Regional Science* (Fischer and Nijkamp 2020), the concept of ‘border’ shows up only a few times, whereas related concepts such as ‘space’ and ‘region’ are ubiquitous all over the 1700 pages of this opus. Since its inception in the 1950s, regional science has focused its attention on the study of regions or of the space-economy in a heroic attempt to introduce the element of ‘space’ explicitly in the traditional economic ‘wonderland of no spatial dimensions’. In so doing, the existence of regions (or of spatial demarcations in geographical space) was largely taken for granted; regions were supposed to be administrative, physical, or planning areas whose socio-economic problems had to be examined in an analytical way. From the outset, it was insufficiently recognized that regions do not exist without pre-specified borders. However, borders have—with a few exceptions (e.g. Lösch 1954; Hansen 1981)—been an underresearched topic in regional science, in contrast to, for instance, political science, sociology, or political geography. Since borders are essentially at the core of regional science research—as the multidisciplinary study of the complex space-economy—it seems pertinent to advocate a more central position of borders in regional science research. We will begin this paper with a very concise historical note depicting the scene of regional science as of the post-WW II period.

Regional science has already a respectable history which dates back to the 1950s when the founding father of regional science, Walter Isard, published his first works on what he then called ‘regional science’. The emphasis was mainly on the development of—often quantitative—methods for a proper multidisciplinary understanding of the interwoven and complex space-economy. His most cited work is called ‘*Methods of Regional Analysis*’ (Isard 1960), which highlights Isard’s interest in the methodology of regional science. Clearly, over the past 60 years, regional science has broadened its scope in various directions, ranging from regional growth theory to spatial econometrics, and from spatial policy analysis to geoscience methods. A comprehensive overview of the current state-of-the-art in regional science can be found in a compendium containing some 90 articles on advanced theories and methods in regional science (see Fischer and Nijkamp 2020).

It is noteworthy that in the early days of regional science, quite some attention has been paid to the nomenclature and the spatial object of study in regional science. Is regional science a separate science or is it an amalgam of several disciplines (e.g., geography, economics, political science, sociology)? Might the name ‘regional studies’, ‘spatial science’, or ‘geographical economics’ perhaps be more appropriate? For pragmatic reasons, at the end, the choice was made to use the term ‘regional science’ as a generic concept for studying social science phenomena from a spatial perspective (see also Nijkamp and Ratajczak 2015).

It should be added that—with the emphasis on quantitative approaches in regional science in the vein of the ‘quantitative revolution in geography’ (see Kourtit et al. 2020)—the conceptualisation and contextualisation of the name ‘region’ received far less attention. In the practice of regional science research, mostly, a pragmatic solution was chosen, for instance, by taking for granted the existence of administrative delineations that ensure a territorial demarcation of a region, or the degree of statistical interdependencies that define a region on economic grounds, or sometimes planning regions that are the subject of government competences and

hence policy interventions. However, a more fundamental reflection on the nature or functioning of a region as an object of profound research is largely lacking in regional science. Consequently, the question: ‘*what is a region?*’ has remained largely unanswered.

Surprisingly enough, there has been limited attention for classifications of regions in the history of regional science (see, e.g., Paelinck and Nijkamp 1976), but the ‘*raison d’être*’ of regions, their genesis, and their dynamics has hardly enjoyed any interest in the history of regional science. There is an extant literature on regional dynamics, but hardly any study on border dynamics in regional science. A noteworthy recent exception is a study by Farrell (2018) on the impacts of changing borders on urbanisation phenomena and socio-economic outcomes.

Of course, in reality, one may be inclined to adopt a functional perspective on regions (for instance, the degree of industrial or service orientation), but one might also adopt a socio-demographic point of view (for instance, the degree of population density, or age, gender or ethnic profiles). It goes without saying that in case of multiple demarcation criteria, no unambiguous regional or territorial delineation can be found, as each individual mono-criterion region may partly overlap with others, while depending on the degree of multicollinearity among the relevant demarcation criteria, the number of constituent regions may also vary for each criterion employed.

In the context of regional science—as a multidisciplinary approach to the study of spatial structures and developments from a broad social science perspective—it makes sense to approach the regional issue in particular from a socio-economic angle. In essence, for a regional scientist, the region is the (inter)action arena of people or business, which shapes—and is shaped by—human behaviour and attitudes over a long-term horizon. It is the place where poverty and wealth, jobs and unemployment, education and skills, quality of life and health, birth and death, culture and technology, or economic history and future meet. Consequently, ‘the region’ in an objective sense does not exist. It is partly a human–social construct, partly a resource–economic construct, partly a stakeholder–political construct, and partly a physical–geographical construct (cf. Harvey 1969).

Clearly, if the region is a territorial platform with many appearances, the question also arises what the borders of a region are. Are these also based on human conceptions, on economic interests, on political power, or on natural constraints? Borders between regions are mainly based on human decisions, influenced by a variety of motives. However, borders have serious consequences, often perceived as impedance costs. However, they may also prompt positive economic effects.

The present paper will address the nature of spatial borders between regions. Clearly, regional borders are geographical demarcations which are on one side of the spectrum shaped by relatively homogeneous characteristics (e.g. resources) within an area and are on the other hand, in a new digital world, increasingly dependent on digital socio-economic interconnectivity patterns without clear space limits. Our focus will not be on a strict terminological definition of spatial borders, but on the functional opportunities of borders for an open spatial economy. We will argue here that various borders, as long as they are not entirely closed, may generate permeability advantages on two sides of the border. We will use Sen’s (1992) capability theory

as a conceptual vehicle for a positive view on the existence of borders. Thus, our paper aims to show that borders may be a source of new socio-economic possibilities for regions in regional science research.

The paper is organized as follows. Section 2 will provide a selection of ideas and theories on borders that have emerged in various disciplines. Then, in the next section, the notion of borders from the perspective of regional science will be highlighted. The subsequent section (Sect. 4) will make a plea for the concept of ‘enabling space’ in border-line discussions and will emphasize two caveats in a demarcation analysis, viz., intra-regional homogeneity and extra-regional connectivity. Section 5 will then provide some retrospective and prospective remarks.

## 2 Multiple perspectives on borders

In the extensive social science literature on spatial or social fragmentation, borders are usually seen as spatial demarcation lines between heterogeneous sets of people, objects, or characteristics. Borders are clearly not crafted in stone, but are *inter alia* the outcome of human decisions—often over a long time horizon—either explicitly (e.g., political borders between nations) or evolutionary (e.g., changes in cultural cohesion or in language similarity). There is an extant, but very diversified, literature on the characteristics, emergence, and change of borders, based on scientific contributions in different disciplines (see for rather random examples: Albert et al. 2001; Anderson and Waver 2004; Hastings and Wilson 2012; Nail 2016; Rumford 2006; van Houtum 2004). And since 1990, there is even a *Journal of Borderlands Studies*. However, in the regional science literature, border studies are clearly under-represented, as a consequence of the fact that its focus was mostly on the regional-economic fabric and less on demarcation issues and their implications.

In early Roman times, the border (in old Latin: *limes*) was used to draw a demarcation line between the civilized Roman society and the barbarian world. The term ‘*limes*’ is also the root of the concept of ‘*limology*’, the scientific study of borders. However, a critical question is: Are these borders physical, cultural, or political in nature, and what is their impact? And are these impacts always negative? And the most important question in the context of regional science is: Can regional science help building a better understanding of the relevance of borders for regional development?

In the rich literature on borders (written by political scientists, historians, geographers, sociologists, economists, anthropologists, or lawyers), we find also related terms like boundaries, frontiers, or border areas (see, e.g., Shears 1970). In *stricto sensu*, a border is normally seen as a geographical demarcation line dividing two territories, each with a high degree of sovereignty and political jurisdiction, while a boundary is usually a more general and abstract delineation of two disjoint sets (e.g., groups, cultures, or ideas). A frontier has sometimes a geopolitical demarcation meaning (e.g., between states), but it may also refer to border areas or borderland regions. Historically, borders define clearly the territorial identity of nation-states, as is exemplified in a study by MacMillan (2003) on the definition of the territorial borders of nation-states in Europe after WWI.

A first obvious delineation principle for border identification originates from physical geography. Mountains (like the Alps or the Pyrenees), rivers (like the Rhine or the Danube), and seas or lakes (like the Mediterranean) have been natural barriers which in the course of history has led to the emergence of indigenous cultural, language, economic, or political features that were supported by physical geographical barriers so as to create a spatial homogeneity or areal identity. Nevertheless, it should be noted that physical borders may also have a uniting effect. For example, Switzerland is a strongly united country as a result of the Alps. And the Mediterranean is not only a maritime separation line between Europe and North-Africa, but is historically also acting as an integrative trade area ('Mare Nostrum'). An informative empirical study on bridging borders can be found in Christodoulou and Christidis (2020).

It should be noted that in most cases, borders are not deterministic in nature; they are the result of human decisions, conventions, or brutal force in the course of history. In this context, geopolitics has been another source of reference for the demarcation of cities, regions or nations, and for the rise of nation-states or region-states (see, e.g., Alesina and Spolaore 2003; Dahl and Tufte 1973; Goyal and Staal 2004). In addition to political power conflicts and territorial wars (see, e.g., Arieli 2016; Brown 2010), geopolitics has also addressed the question of the optimal size of a country or regions (e.g., based on growth indicators), taking into account given geo-physical characteristics in the context of multidimensional welfare optimization (see, e.g., Spolaore and Wacziarg 2005).

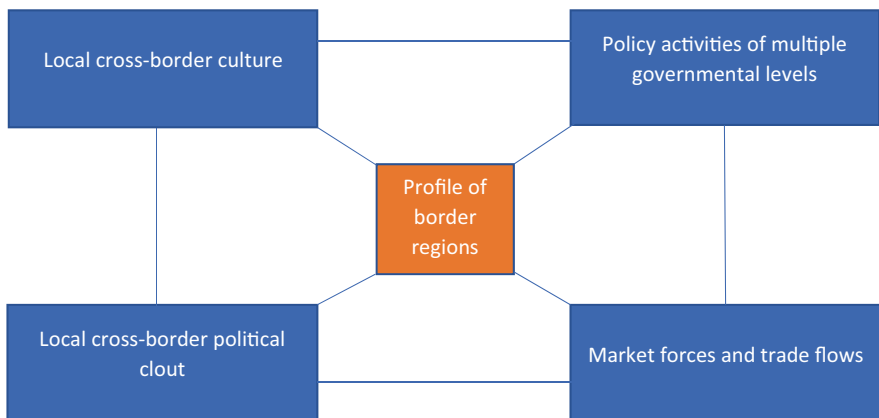
Public administration is another (institutional) authority creating border, especially at local and regional scales. After a long history of secession of localities, we observe nowadays a worldwide trend to upscaling of municipalities, communes, and countries towards higher order agglomerations or mergers, based on the principle of administrative scale advantages. For example, Farell (2018) argues that the rise in degree of urbanisation in many countries is not caused by a population influx into urban agglomerations, but by a redefinition of city borders (in most cases, a merger). Public administration has provided a powerful mechanism for a border demarcation (local cadastral data, socio-economic statistical data, population registers, census data, and last but not least the presence of local democracy). Consequently, borders do not only have a physical, political, or functional meaning, but also a legal meaning: illegal crossing of a border may even be a case of crime, as is witnessed by the current undocumented foreign migration flows.

Once borders are legalized, the land behind the borders becomes a borderland area, with a high degree of exclusiveness for the people residing in this borderland. Clearly, there will be an eternal dispute in many countries and regions on the question who had the competence to define a border. Postcolonial discussions, but also ongoing conflicts between the original population of a country (e.g., Maori's in New Zealand, Aboriginals in Australia, Indians in the US, and Palestinians in Israel) demonstrate that the border discussion is an '*Unvollendete*'. Rather than developing an unambiguous separation principle for border demarcations, it might be more fruitful to look at the positive side of borders as a source of socio-economic opportunities (Arieli 2016), at least if borders have some degree of (semi-) permeability or porosity, based on functional-economic, cultural, or political characteristics or desiderata

(see van Geenhuizen and Ratti 2001). If borders do not discourage cross-border interaction (or at least do not prohibit it), actors on both sides of the border may find create ways for interaction and trade. Then, creative actors may generate mutual benefits (the so-called ‘active space’ concept). In other words, borders may have a positive function if they can be transgressed or traversed. This ties with the current trend towards an open-access globalized society (see also Nijkamp et al. 1990).

It is interesting to observe that in the long history of border studies, only a few scientific efforts have been made to develop a general border theory. A noteworthy contribution—far outside regional science—can be found in the fundamental and seminal works of Brunet-Jailly (2004, 2005). He argues that in the broad and multidisciplinary literature on borders, boundaries, frontiers, and borderland regions generally four equally important analytical lenses can be distinguished: (1) market forces and trade flows; (2) policy activities of multiple levels of government on adjacent borders; (3) the particular clout of borderland communities; (4) the specific culture of borderland communities. Each of these four analytical dimensions is able to contribute to the space–time change in both structural forces and agents concerned in a contextual perspective (e.g., political, geographic, and cultural conditions). His original insights do not provide an unambiguous theoretical framework, but sketch out the contours of border studies in a regional context. In a simplified form, these cornerstones of Brunet-Jailly’s border theory can be represented in the following figure (see Fig. 1). This figure shows that the essence of border regions is shaped by four fundamental drivers.

The author argues that complementarity (or mutual reinforcement) of these four characteristic drivers may support the cultural vitality and integrative power of borderland regions. This notion of a multidimensional area for the emergence of borders has been extended in a subsequent study by Konrad and Nicol (2008). Other important studies on general border principles can be found in Paasi (2003) and Sidaway (2000). It would of course be a challenging question to explore more precisely the multiple drivers and complex nature of the border concerned. If the border is a



**Fig. 1** Conceptualisation of border studies (after Brunet-Jailly 2004, 2005) Source: adjusted by the author

human construct, it may be relevant to trace human decisions and values in border creation (see also Martinez 1994; Velasco Ortiz and Contreras 2014; Gjergji 2015). Furthermore, borders may vary in appearance and consequences, ranging from entirely closed (e.g., North Korea) to entirely open (e.g., EU countries). Next to general border conceptualizations and socio-political studies, there are also a few noteworthy socio-economic and spatial border studies, based on borders as a potential resource, for instance, Sohn (2014) on Europe, and Nugent and Asiwaju (1996) and Feyissa and Hoehne (2010) on Africa. This opportunity will be the subject of study later on in this paper. However, first, we will discuss some contributions from the side of regional science on border studies.

### 3 Checkpoint Charlie and regional science

*Checkpoint Charlie* symbolizes the ‘hard’ border between regional political systems. It is the historic name of the border-crossing point in the Berlin Wall between East- and West-Berlin during the period of the Cold War. It was erected in 1961 to stop emigration from East Germany to the free West. Checkpoint Charlie symbolizes the Cold War and its enforced separation of East and West. It lasted for about 30 years and is still nowadays a landmark in the history of geopolitical borders: it was an absolutely closed border, with excessively strict entry regulations (cf. the notion of ‘Walled States’, introduced by Brown 2010) (see also Baker 2004; Hartwich 2010). The Iron Wall provided an impermeable border, but it helped Berlin also to obtain economic and fiscal advantages.

Regional science does not have an integrated theory on spatial borders, and therefore, it is not possible to depict the contours of a balanced spatial border theory. It is noteworthy that in the history of regional science, regions are regularly regarded as open spatial systems (see, e.g., the father of modern location theory Lösch 1954). The only distinguishing feature among regions is their heterogeneity in socio-economic, demographic, cultural, technological, political, or physical–environmental conditions. Such pluriform features lie also at the heart of modern regionalism (see Goyal and Staal 2004), that may also form the basis for good friendships in economic terms. In the geography of frontiers and boundaries (Prescott 1965), a wide range of historical–geographical determinants is discussed that shape borders and that determine high economic border costs. Clearly, a situation of open borders (e.g., among regions or urban areas) may provide many benefits to all actors involved (see Amin 2003). There is a wealth of studies by geographers and regional scientists on the characteristic features of borders at different geographical scale levels ranging from localities through regions to continents, while also discriminating policy regimes are extensively discussed (see inter alia Anderson and Wever 2004; Anderson 1996; Buchanan and Moore 2003; Jones 1959; Perkmann and Sum 2002). It is also interesting to observe that regional science is more interested in border regions (see, e.g., Hansen 1981, or Niebuhr and Stiller 2003, 2004) than in borders per se.

In general, borders are not crafted in stone. Open borders create bridges that allow for human and economic interaction, at least when facilitated by fit-for-purpose regulation (see, for instance, Church and Andrew 1999; House 1980; Maillat

1990; Newman 2003; Paasi 1999). Since intra-country regional systems are in general characterized by a high degree of openness due to a national uniform jurisdiction on the space-economy of the country concerned, regional science is often less concerned with cross-border transaction costs associated with interregional trade and transport, in contrast to international trade theory where border restrictions are often a handle for acquiring (usually short-term) economic advantages. An important contribution on the close relationship between trade theory, location theory, and the new economic geography can be found in Niebuhr and Stiller (2004). Despite the validity of international network connectivity (see Castells 2000) and the popularity of the concept of the borderless world (see Ohmae 1990), the current practice is often still one of the national protectionism. The US–China trade war and the great many trade and transport restrictions during the corona virus period have clearly demonstrated that the good old economic principles of free trade in a heterogeneous space-economy are not always respected.

An original and convincing argument for shaping a world with open borders in a regional science context can be found in van Geenhuizen and Ratti (2001). These authors do not only offer an interesting typology of borders, but make also a plea for open borders, based on the concept of active border regions. This means that border regions should not see their border as a given demarcation line that obstructs their economic freedom, but should try to cooperate across the border to gain competitive advantages by innovative trade strategies (see also Capello et al. 2018). A successful example of such border region interactions can be found along the internal borders of the EU states, such as the ‘Euregio’ concept in which adjacent regions on two sides of the borders cooperate on many matters (e.g., security, health, education, infrastructure, etc.). It is thus clear that borders may form impediments to the economy, but creative forms of border policy may also generate economic advantages. Regional science has been unable to design a border theory; the question is: Is there an alternative way of looking at borders? This will be further highlighted in the next section where borders will be interpreted from an opportunity perspective.

#### 4 Borders as enabling opportunities

In the regional-economic literature, borders are usually regarded as barriers in the space-economy that cause relatively higher costs for spatial interaction through trade and transport. One of the founding fathers of regional economics, August Lösch (1954) interpreted borders as distance frictions that increase the marginal transportation costs of goods or labour in moving from one area to another, e.g., through trade or transport. Despite the current digital world, physical cross-border movements are still an excessively important part of trade in a globalizing world. In addition, borders mean also a limitation for the coherence of governmental policies and for the free operation of social networks and social capital (Helliwell 1996). In the past decade, a wealth of studies has been pursued on measuring the economic loss in terms of costs caused by borders due to their transaction costs (for instance, in the form of impediments to cross-border accessibility). A well-known economic study on the high costs of uncoordinated strict borders among different nation-states can



be found in the Cecchini Report (1988), which assessed the costs of non-Europe before the creation of the EU. Examples of more recent empirical studies on border costs based on spatial interaction and gravity models can be found inter alia in Condeco-Melhorado and Christidis (2017), McCallum (1995), Persyn and Torfs (2016), Plat and Raux (1998), Rietveld (2012), and Sohn and Licheron (2018). In particular, the latter study is interesting, as it seeks to identify negative and positive effects of borders on the development of cities and border areas. However, the question is: Can borders also be a ‘blessing in disguise’? And may borders act as a catalyst for new development? In the present section, the functioning of borders as a potential source of new opportunities in spatially fragmented economies will be treated, inspired by Amartya Sen’s (1980) *enabling (or capability) theory*.

It should be noted that borders—apart from restricting the free mobility of people and goods—may under certain conditions also create externalities that lead to positive outcomes in the form of smart specialisation, controlled balanced growth, or sustainable development. Porous borders may be able to support certain cross-border functionings that benefit two sides of the border, in particular if walled border regions are replaced by permeable frontiers, with active and innovative agents. If borders may act as both barriers and bridges, the question arises under which conditions borders may lead to shared positive outcomes.

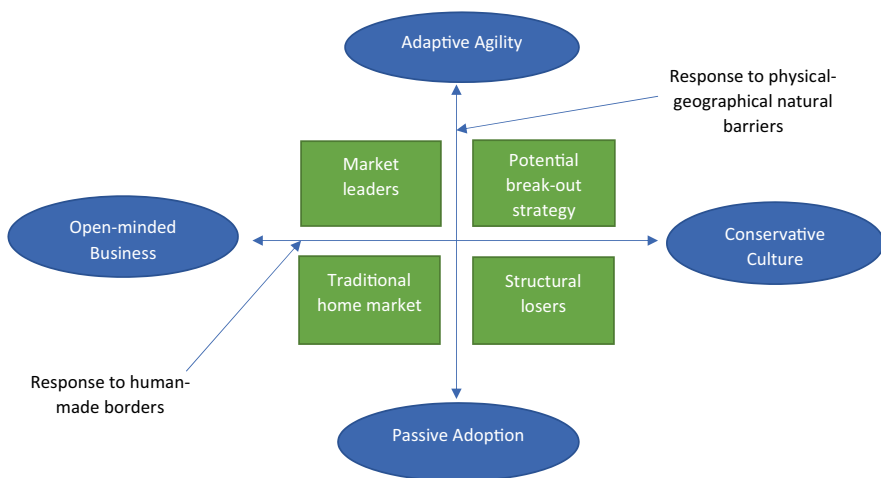
In a competitive world, the economic performance of nations or regions is driven by the effective use of resources (including physical resources, open cultures, creative entrepreneurship, skills, education, etc.). Physical geography may create impediments, but may also induce specialized opportunities. The successful Swiss watch industry, mainly based in the isolated and less accessible region of the Jura, has become a world-leading sector due to its quality products, the sophisticated craftsmanship, and its marketing strategy. Thus, in contrast to geographical determinism, there is much more scope for the geography of possibilism (Vidal de la Blache 1903), which argues essentially that any region is to a large extent a governor of its own fate (see also Johnston et al. 2000). It is not the pure presence of resources that determine the economic outcome of a region, but its effective and creative use. The resource base theory has already a long history and dates back to an earlier study of Zimmerman (1933), who argued that resources do not exist, but become useful if employed in a proper way. Thus, resource use means the mobilisation of latent assets.

In a recent study, Nijkamp (2018) has introduced the notion of a *resourceful region*. The idea is that each region has a portfolio of development opportunities and conditions (resources or capabilities). Smart policy and decision-making should see it as its greatest challenge to combine and to optimize the various choice options and next to implement these, so as to achieve the highest revenues or performance from a large set of realized functionings in a place-based economy. Consequently, it is not the pure presence of resources that determines the economic fate of a region, but its smart combination and the use of the resource functionings. Borders are human-made constructs, and hence, smart border policy presupposes intelligent and pro-active choices. It is thus evident that regional capability does not refer to the actual *presence* of natural or man-made (scarce) resources, but to the way inhabitants and business *use* these resources. The

existence of a border may mean of course a lower cross-border access between two adjacent regions on both sides of the border, but it may create a potential access (accessibility) for developing specialized goods or dedicated talents, as long as borders provide a porous frontier for spatial interaction. For example, Las Vegas has managed to become a wealthy city in Nevada, as a result of the creative use of casino restrictions in other states. A creative use of border impediments may prompt a smart regional specialisation, provided that the actors are able and capable to exploit all available opportunities in the border regions.

Sen's (1980, 1992) capability theory—essentially an outgrowth of Vidal de la Blache's possibility theory—asserts in essence that the position of individuals or groups (including regions) on the welfare ladder is not one-to-one related to resource *availability*, but is at the end determined by effective and smart resource *use*. Any region is a source of functionalities to be exploited. To systematize Sen's framework, we have in a concise stylized way mapped out the main driving forces of his theory. Such ideas can systematically be sketched out by the diagram presented in Fig. 2, which contains two axes and four distinct quadrants.

Figure 2 has two axes, viz a *vertical* axis describing the human response to natural-physical barriers, ranging from passive acceptance to pro-active behaviour, and a *horizontal* axis describing the human response to man-made borders, ranging from opportunity-seeking behaviour to traditional perception. The  $2 \times 2 = 4$  quadrants in Fig. 2 map out the possible combinations of the cross-border actors' responses and the economic implications. In this way, one may categorize different strategic reactions of actors involved. Figure 2 maps out the arena for a regional development potential strategy. It is not yet a theory per se, but any theoretical framing of regions and borders might have to consider the underlying systematics. Figure 2 may then also be used as an analytical framework of specifying testable propositions. This could be the foundation for further applied research.



**Fig. 2** Response strategies to borders

Each of the four quadrants of Fig. 2 thus implies a potential regional strategy based on the concept of a resourceful region which was inspired by Sen's capability theory. Public policy, including regional policy, can help regions to be more proactive and resilient, but it is clear that the development of a region's welfare profile is at the end shaped by the indigenous and orchestrated efforts of the region itself. Public policy can enhance the capability of a region, but the response is the competence of the region itself.

Figure 2 sketches out the foundation of the *resourceful region* principle. The resourceful region has in principle a varied set of productive assets that may enhance its productivity, in comparison to both past performance and welfare profiles of other regions. For border regions, resources like infrastructure (e.g., utilities, transportation, and telecommunication), social infrastructure (e.g., housing and social capital), land and natural resources (e.g., natural gas), socio-economic business assets (e.g., entrepreneurial spirit), educational capital (skills, leadership, and labour force participation), or cultural diversity (e.g., ethnic migrant composition) may all contribute to the multidimensional capability profile of a region. For a border region, the main challenge will be to choose a smart set of functionings of these resources that—once being employed—contribute to the performance of the border region, whenever possible in harmony with an adjacent region across the border.

Analytically, a main challenge will be to design statistical and econometric tools based on actual use indicators for resources (and not on their actual presence). The next challenge will be to identify indicators for the degree of permeability (or porosity) of cross-border regional economies in relation to the used functionings (in Sen's sense) of the resources concerned. After these two hurdles have been taken, conventional research methods (like agglomeration and location analysis, geoscience methods, network and spatial econometric models, gravity and spatial interaction models, multi-sectoral input–output analysis, or modern complexity and resilience analysis) can be applied (see Capello et al. 2020).

There is one more important element to be taken into account in border analyses. Regional cooperation may—as a result of existence of borders—be a policy vehicle to gain supraregional benefits. Borders (physical, cultural, political, social, etc.) create distinct territories, with own typical features that are territorially bounded. Consequently, borders may jeopardise the socio-political objective of *cohesion* among regions or nations (see Nijkamp 1994). In particular in Europe, cohesion policy has become one of the fundamentals of common European policy for heterogeneous areas (see, e.g., Camagni 2005; Capello et al. 2008; Davoudi 2005; Faludi 2010; Molle 2007; Schön 2005). In an informative and critical assessment of territorial cohesion, Bradley and Zaucha (2017) outline three basic functions (or principles) of territorial cohesion as follows: (i) reinforcement of interregional solidarity; (ii) enhancement of regional competitiveness and innovation; (iii) integration of sectoral policies. They also identify five types of spatial barriers between regions that obstruct social and economic cohesion and that need to be improved: (i) removal of transborder infrastructural barriers; (ii) improvement of connectivity between border regions and heartlands in Europe; (iii) enhancement of transborder cooperation (ranging from economic or social to cultural and governmental); (iv) creation of transnational institutions serving urgent common concerns (e.g., river flood

management); (v) development of cooperative networks in science, R&D, and education. It goes without saying that strict border definitions and regulations may jeopardise the shared benefits of territorial cohesion. Figure 2 might be a useful tool for identifying and mapping out the potential benefits of smart cross-border policy.

Borders are—in their effects—man-made constructs. They can frustrate a joint sound socio-economic development, but they can also act as innovative edge areas where new ideas are born and economic growth can be accelerated. The example of the Euregio Aachen–Heerlen–Liege–Maastricht region as a cross-cutting high-tech area in three countries (Germany, The Netherlands, and Belgium) illustrates that borders may act as seedbeds for creative cooperation. Clearly, interregional development studies and cross-border studies go hand in hand.

## 5 Retrospect and prospect

Our study has made an attempt to provide a new opportunity-based perspective on borders as an essential characteristic of an interregional development strategy. Borders will never vanish; they may change in nature or perception. One of the first early comprehensive cartographic maps that were also used during early discovery trips in the fifteenth and sixteenth century was produced by an Arab geographer, Al-Indrisi, in the twelfth century. His maps contained the known earth, which was demarcated by a border-line. The earth was flat, and beyond the known territories and seas, there was empty space. Borders were a necessity to understand the organisation of the geography of our world.

Nowadays, borders of all kind (political, historical, geographical, natural, cultural, social, ethnic, and economic) do exist. They reflect in most cases a long—often dynamic—history ('kinopolitics' or 'work in progress') and demarcate distinct areas (e.g., in terms of jurisdiction, language, culture, and economy). Competitive advantages between economically disjoint regions may be a source for cross-border trade and transport that may enhance overall economic welfare. However, borders have a multiplicity of different appearances and functions which may contribute in different (positive or negative) ways to socio-economic welfare in distinct adjacent regions across the border. Efficient transport systems and use of modern ICT may facilitate border crossings (see, e.g., Porter 2003; van Geenhuizen 2007). However, borders may also create innovative adaptive mechanisms so as to cope with border costs and to turn the existence of such barriers into new opportunities. Thus, there is not one single or unambiguous border; there are many types of borders, with different features, functions, impediments, or opportunities. Smart border policy seeks to identify an optimal portfolio of different, sometimes complementary border functionings in the sense of Amartya Sen. Clearly, despite the great economic potential of borders for growth and innovation, it ought to be recognized that border benefits are normally not systematic. Clearly, the presence of common borders does not imply equally shared benefits (see Kratke 1999).

From the exposition in the present paper, we make a few final observations: (i) our planet has numerous pluriform and heterogeneous regions that are normally delineated by whimsical borders of all kind (varying between 'thick' borders and

‘thin’ borders); (ii) the numerous actors in the space-economy are all diversified and heterogeneous; (iii) the spatial landscape of regions, borders, and actors is not static, but displays an evolutionary pattern (with now and then fractal disruptions and perturbations, e.g., in case of civil wars). Cross-border development studies are thus never static, but evolutionary in nature, in relation to human spatial behaviour (Van Houtum and Strüver 2002).

As mentioned before, borders may show dynamic or evolutionary features, witness also the development of borders in the EU. They may change or even be mobile (‘bordering dynamics’), as is argued by Sohn and Licheron (2018). The above-mentioned remark on the dynamics of borders is found back in current rebordering debates, in which borders are seen as strategic tools to influence cross-border movements of people or goods. Such a strategy can be pursued for economic reasons (e.g., to prevent smuggling), for political–demographic reasons (e.g., to stop illegal migration), or for security reasons (e.g., to stop terrorist threats). Thus, even though borders may remain, their function may change (see, e.g., Berg and Ehin 2006; Böhm and Drápela 2017; Ribas-Mateos 2015). Clearly, this may also mean that the innovative capacity of actors in border areas may have to adjust to changing circumstances.

## 6 Conclusion

In the present study, we have argued that a generic theory of borders in regional science is hard to design and to test. Regional science does not have a clear theory in itself, and hence, a regional science border theory may be an illusion. In our study, we have advocated a conceptualisation of dynamic border phenomena based on a human-constructed establishment of borders, evolving from a walled fortification to a new enabling opportunity space. Such a smart border use sees regions as multifaceted containers of diversified socio-economic opportunities to be exploited by regional agents in an intelligent and innovative way, based on a synergy of social, institutional, economic, and natural resources on two sides of the border. Thus, border opportunities may in particular be generated in case of shared benefits (a ‘win–win’ situation), even though the benefits might not be equal. Despite current rebordering debates (e.g., Brexit, COVI-19, migration floods, and securization), borders will keep their function as opportunity gateways.

The current popular jargon in digital geography on a ‘borderless world’ (Ohmae 1990) seems somewhat biased. If there are no borders, there are no regions or nations; advocating such a fluidity in political or socio-economic geography misses also the point. The question is not: do we want borders, but: how to use borders in a smart way? The capability interpretation of the welfare potential of border regions—also coined the ‘resourceful region’ concept—may be helpful in inducing an agility in cross-border regional development strategies.

Smart border policy may mitigate ‘thick borders’ and support cross-border entrepreneurial and innovation networks in our open-access frontier area, while encouraging cross-border grassroot initiatives and partnerships (Nooteboom 2012;

Westlund 2006). Clearly, trust, reciprocity, and shared ambitions are a *sine qua non* for a successful and smart cross-border policy.

From a research perspective, the development of a permeability index describing the multidimensional relative openness of borders between regions is a worthwhile endeavour. This would call for a granular analysis of the structure of spatial borders and of the variety of heterogeneous spatial interactions (material and immaterial) between regions on both sides of the border. Modern detailed transport and communication data (including social media information) might be instrumental in creating a quantitative permeability index for each spatial border. Such a border permeability measure might also be useful as a proxy parameter for spatial friction (or impedance) in gravity models or as an operational solution for defining a spatial weight (matrix) in spatial autocorrelation analysis or spatial econometrics. Borders shape selective functions for adjacent regions and may induce unanticipated win–win situations.

Borders and their adjacent regions need to be regarded as active spaces with a great growth potential, if the shadow sides of borders are turned into sunny possibilities. This new perspective will also call for a new interpretation of spatial proximity (as reversed distance friction) (see Torre and Wallet 2014; Caragliu 2015; Kourtit 2018; Nijkamp 2018). The capability theory argues essentially that regions—including border regions—do not provide automatically welfare or prosperity. Based on an enabling perspective on option theory, it seems more pertinent to argue that regions comprise a portfolio of interesting and flexible opportunities. The optimization of their functionalities (in terms of the actual provision of attractive market services) calls for an intelligent choice of different territorial capital constituents. In summary, regions and borders are not providers of welfare, but enablers of welfare. Regional science does not offer a testable theory on borders, but by a merger of regional science knowledge with a region-based capability approach, it is possible to design the contours of a conditional border perspective on regional development.

**Acknowledgements** The author acknowledges the grant of the Axel och Margaret Ax:son Johnsons Stiftelse, Sweden. The author also acknowledges the grant of the Romanian Ministry of Research and Innovation, CNCS—UEFISCDI, project number PN-III-P4-ID-PCCF-2016-0166, within the PNCDI III” project ReGrowEU -Advancing ground-breaking research in regional growth and development theories, through a resilience approach: towards a convergent, balanced, and sustainable European Union (Iasi, Romania).

## References

- Albert M, Jacobson D, Lapid Y (eds) (2001) *Identities, borders, orders: rethinking international relations theory*. University of Minnesota Press, Minneapolis. <https://doi.org/10.5749/j.cttst8f>
- Alesina A, Spolaore E (2003) *The size of nations*. MIT Press, Cambridge
- Amin A (2003) *Regions unbound*. *Geografiska Annaler B* 86:33–44
- Anderson M (1996) *Frontiers, territory and state formation in the modern world*. Cambridge Polity Press, Cambridge
- Anderson J, Wever E (2004) *Borders border regions and economic integration*. *J Borderl Stud* 19(1):27–38
- Arieli T (2016) *Borders, conflict and security*. *Int J Conflict Manag* 27(4):487–504

- Baker F (2004) The Berlin wall. In: Ganster P, Lorey DE (eds) *Borders and border politics in a globalizing world*. Rowman & Littlefield, Lanham
- Berg E, Ehin P (2006) What kind of border regime is in the making? Towards a differentiated and uneven border strategy. *Coop Conflict* 41:53–71
- Böhm H, Drápela E (2017) Cross-border cooperation as a reconciliation tool: example from the east Czech-polish borders. *Reg Fed Stud* 27(3):305–319
- Bradley J, Zaucha J (eds) (2017) *Territorial cohesion*. Uniwersytet Gdanski Katedra Makroekonomii, Gdansk
- Brown W (2010) *Walled states, waning sovereignty*. Zone Books, New York
- Brunet-Jailly E (2004) Toward a model of border studies. *J Borderl Stud* 19(1):1–18
- Brunet-Jailly E (2005) Theorizing borders. *Geopolitics* 19(4):630–649
- Buchanan A, Moore M (2003) *States, nations and borders*. Cambridge University Press, Cambridge
- Camagni R (2005) The rationale for territorial cohesion. In: Boscaine P (ed) *Present and future of the European spatial development perspective*. Alinea, Firenze, pp 121–138
- Capello R, Camagni R, Chizzolini B, Fratesi U (eds) (2008) *Modelling regional scenarios for the enlarged Europe*. Springer, Berlin
- Capello R, Caragliu A, Fratesi U (2018) Measuring border effects in European cross-border regions. *Reg Stud* 52(7):986–996
- Capello R, Kleibrink A, Matusiak M (2020) *Quantitative methods for place-based innovation policy*. Edward Elgar, Cheltenham
- Caragliu A (2015) *The economics of proximity*, PhD Dissertation, VU, Amsterdam
- Castells M (2000) *The rise of the network society*. Blackwell, Oxford
- Cecchini Report (1988) *The cost of non-Europe in the single market*. Commission of the European Communities, Brussels
- Christodoulou A, Christidis P (2020) Bridges across borders: a clustering approach to support EU regional policy. *J Transp Geogr*. <https://doi.org/10.1016/j.jtrangeo.2020.102666>
- Church A, Andrew P (1999) Cross-border cooperation. *Reg Stud* 33(7):643–655
- Condeco-Mehorado A, Christidis P (2017) Road accessibility in border regions: a joint approach. *Netw Spatial Econ* 18(2):363–383
- Dahl R, Tufte ER (1973) *Size and democracy*. Stanford University Press, Stanford
- Davoudi S (2005) Understanding territorial cohesion? *Plan Pract Res* 20(4):433–441
- Faludi A (2010) *Cohesion, coherence cooperation*. Routledge, New York
- Farrell K (2018) *Rapid Urbanisation*, PhD, KTH, Stockholm
- Feyissa D, Hoehne M (eds) (2010) *Borders and borderlands as resources in the horn of Africa*. Boydell & Brewer, Rochester
- Fischer MM, Nijkamp P (eds) (2020) *Handbook of regional science*. Springer, Berlin
- Gjergji I (2015) Lost in the Mediterranean: theories, discourses, borders and migration policies in the ‘Mare Nostrum.’ *Revista Criticade Ciercias Socias* 7:1–10
- Goyal S, Staal K (2004) The political economy of regionalism. *Eur Econ Rev* 48:563–593
- Hansen NM (1981) *The border economy*. University of Texas Press, Austin
- Hartwich OM (2010) After the wall: 20 years on. *Policy* 25(4):8–11
- Harvey D (1969) *Explanation in geography*. Edward Arnold, London
- Hastings D, Wilson TM (eds) (2012) *A companion to border studies*. Wiley-Blackwell, Chichester
- Helliwell JF (1996) Do national borders matter for Quebec’s Trade? *Can J Econ* 29(4):509–522
- House JW (1980) The frontier zone: a conceptual problem for policy makers. *Int Political Sci Rev* 1(4):456–477
- Isard W (1960) *Methods of regional analysis*. MIT Press, Cambridge
- Johnston RJ, Gregory D, Pratt G, Watts M (2000) *The dictionary of human geography*. Blackwell, Oxford
- Jones SB (1959) Boundary concepts in the setting of place and time. *Ann Assoc Am Geogr* 49:241–255
- Konrad V, Nicol H (2008) *Beyond walls*. Ashgate, Aldershot
- Kourtit K (2018) Super-proximity and spatial development. *J Reg Res* 36:215–231
- Kourtit K, Elmlund P, Nijkamp P (2020) The urban data deluge. *Int J Urban Sci*. <https://doi.org/10.1080/12265934.2020.1755353>
- Kratke S (1999) Berlin’s regional economy in the 1990s: structural adjustment or ‘open ended’ structural break. *Eur Urban Reg Stud* 6(4):323–338
- Lösch A (1954) *The economics of location*. Yale University Press, New Haven

- MacMillan M (2003) Paris 1919. Random House, New York
- Maillat D (1990) Transborder regions between members of the EC and non-member countries. *Built Environ* 16(1):89–101
- Martinez VJ (1994) Border people. University of Arizona Press, Tucson
- McCallum J (1995) National borders matter. *Am Econ Rev* 85(3):615–623
- Molle W (2007) European cohesion policy. Routledge, London
- Nail T (2016) Theory of the border. Oxford University Press, Oxford
- Newman D (2003) Borders and Power. *J Borderl Stud* 18(1):13–24
- Niebuhr A, Stiller S (2003) Territorial disparities in Europe. *Intereconomics* 38(3):156–164
- Niebuhr A, Stiller S (2004) Integration and labour markets in European border regions, HWWA discussion paper, 284. HWWA, Hamburg
- Nijkamp P (ed) (1994) New borders and old barriers in spatial development. Ashgate, Aldershot
- Nijkamp P (2018) The resourceful region. *J Reg Res* 36:191–214
- Nijkamp P, Ratajczak W (2015) The spatial economy: a holistic perspective. In: Nijkamp P, Rose A, Kourtit K (eds) Regional sciencematters. Springer, Berlin, pp 15–26
- Nijkamp P, Rietveld P, Salomon I (1990) Barriers in spatial interactions and communications. *Ann Reg Sci* 24:237–252
- Nooteboom B (2012) Beyond humanism. Palgrave MacMillan, London
- Nugent P, Asiwaju AI (eds) (1996) African boundaries: barriers, conduits and opportunities. Pinter, London
- Ohmae K (1990) The borderless world. Harper Collins, New York
- Paasi A (1999) Boundaries as social practice and discourse. *Reg Stud* 33(7):669–680
- Paasi A (2003) Region and place: regional identity in question. *Prog Hum Geogr* 27(4):475–485
- Paelinck JHP, Nijkamp P (1976) Operational theory and method in regional economics. Saxon House, Wetmead
- Perkmann M, Sum NC (2002) Globalization, regionalization, and cross-border regions. Palgrave, London
- Persyn D, Torfs W (2016) Gravity equation for commuting with an application to estimating regional border effects in Belgium. *J Econ Geogr* 16(1):155–175
- Plat D, Raux C (1998) Frontier impedance effects and the growth of international exchanges: an empirical analysis for France. *Papers Reg Sci* 77(2):155–172
- Porter M (2003) The economic performance of regions. *Reg Stud* 37(6):549–578
- Prescott JRV (1965) The geography of frontiers and boundaries. Aldine, Chicago
- Ribas-Mateos N (2015) New border shifts: mobilities in Europe and beyond. Palgrave Macmillan, London
- Rietveld P (2012) Barrier effects of borders: implications for border-crossing infrastructures. *Eur J Transport Infrastruct Res* 12(2):150–166
- Rumford C (2006) Theorizing borders. *Eur J Soc Theory* 9(2):155–169
- Schön P (2005) Territorial cohesion in Europe. *PlanTheory Pract* 6(3):389–400
- Sen A (1980) Equality of what. The tanner lecture on human values, I. Cambridge University Press, Cambridge, pp 197–220
- Sen A (1992) Inequality reexamined. University Press Cambridge, Cambridge, pp 197–220
- Shears D (1970) The ugly frontier. Chatto & Windus, London
- Sidaway JD (2000) Postcolonial geographies: an exploratory essay. *Progress Hum Geogr*. <https://doi.org/10.1191/030913200100189120>
- Sohn C (2014) Modelling cross-border integration: the role of borders as a resource. *Geopolitics* 19(3):587–608
- Sohn C, Licheron J (2018) The multiple effects of borders on metropolitan functions in Europe. *Reg Stud* 52(11):1512–1524
- Spolaore E, Wacziarg R (2005) Borders and growth. *J Econ Growth* 10(4):331–386
- Torre A, Wallet P (eds) (2014) Regional development and proximity relations. Edward Elgar, Cheltenham
- van Geenhuizen M, Ratti R (eds) (2001) Gaining advantage from open borders. Ashgate, Aldershot
- van Geenhuizen MS (2007) ICTs and higher-order integration of remote regions. In: van Geenhuizen MS, Reggiani A, Rietveld P (eds) Policy analysis of transport networks. Ashgate, Aldershot, pp 257–274
- van Houtum H (2004) The geopolitics of borders and boundaries. *Geopolitics* 10(4):672–679



- van Geenhuizen MS, Nijkamp P (2000) The learning capability of regions. In: Boekema F, Morgan K, Bakkers S, Rutten R (eds) Knowledge, innovation and economic growth. Edward Elgar, Cheltenham, pp 38–56
- van Houtum H, Strüver A (2002) Borders, strangers, doors and bridges. *Space Polity* 6(2):141–146
- Velasco Ortiz L, Contreras OF (2014) The border as a life experience. *Frontera Norte* 26(3):37–56
- Vidal de la Blache P (1903) *Tableau de la Géographie de la France*. Hachette, Paris
- Westlund H (2006) *Social Capital in the Knowledge Economy*. Springer, Berlin
- Zimmerman EW (1933) *World resources and industries*. Harper & Brothers, New York

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