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**Border Barriers as Geopolitical Instruments:
Sovereignty, Security, and Territorial
Transformations in the Twenty-First Century**

Geography of Conflicts

Relatore

Chiar.mo Prof. Pietro Piana

Candidata

Sabrina El Deib

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1. Introduction

Few elements of the international political landscape appear as familiar and taken for granted as borders. They are traced on maps, marked on the ground, and reproduced daily through administrative practices, political discourse, and collective imaginaries. Yet this apparent simplicity conceals a far more complex reality. Borders are not merely geographical demarcations; they are political institutions through which authority, identity, and spatial order are continuously produced and contested. Throughout modern history, borders have played a crucial role in structuring the relationship between territory and power. They have defined the spatial limits of political communities and provided the framework through which states organize jurisdiction, regulate circulation, and construct distinctions between insiders and outsiders. In this sense, borders are not simply lines that separate territories but mechanisms that shape how political space itself is imagined and governed. At the same time, borders are also deeply embedded in broader historical and cultural processes. They reflect past conflicts, colonial legacies, shifting balances of power, and evolving notions of sovereignty. As a result, many contemporary borders are the outcome of layered historical trajectories rather than the expression of clear or natural divisions. Their presence in the landscape therefore represents not only a spatial demarcation but also a material trace of political decisions, negotiations, and struggles that have unfolded over time. In the contemporary world, borders occupy an increasingly visible place within public and political debate. Contrary to earlier expectations that globalization would gradually erode the significance of territorial boundaries, recent developments suggest the opposite trend. Across many regions of the world, states have invested heavily in the construction and reinforcement of border infrastructures, including fences, walls, and technologically enhanced surveillance systems.

Borders are invoked in discussions about security, migration, economic integration, environmental protection, and geopolitical competition. Images of fortified boundaries, humanitarian crises at frontiers, and contested territories frequently circulate in media and political discourse, contributing to renewed attention toward the

spatial organization of political authority. These developments highlight how borders continue to play a fundamental role in shaping the dynamics of the international system. Studying borders therefore provides a crucial perspective for understanding how contemporary societies negotiate the relationship between openness and control, connectivity and separation, integration and fragmentation. More broadly, borders reveal how political power is materialized in space. They show how territorial organization interacts with social practices, economic interests, technological infrastructures, and symbolic narratives. For this reason, the study of borders cannot be limited to legal definitions or cartographic representations; it requires examining the ways in which borders are experienced, contested, and transformed within specific landscapes and historical contexts.

By approaching borders as dynamic and multifaceted phenomena, it becomes possible to explore how contemporary territorial divisions shape not only international relations but also everyday life in border regions and the environments in which they are embedded. In doing so, the analysis of borders offers valuable insights into the spatial dimensions of power and the evolving forms through which political authority is organized. This thesis is structured into five chapters. Chapter 1 introduces the research objectives and questions and outlines the methodological approach adopted in the study. Chapter 2 develops the theoretical and conceptual framework of the research. Chapter 3 presents the selected case studies of contemporary border barriers. Chapter 4 provides a comparative analysis of these cases, identifying key patterns and differences. Finally, Chapter 5 summarizes the main findings of the research and reflects on future perspectives on borders in the twenty-first century.

1.1 Research Objectives and Questions

The starting point of this research is a paradox that is only apparent: while the discourse on globalization emphasizes the idea of an increasingly connected world - traversed by flows of people, goods, information, and capital - the contemporary political landscape is marked by the multiplication of walls, fences, physical barriers, and border-control devices. This phenomenon, which some scholars define as "re-bordering" (Newman, 2006; Paasi, 2009), contradicts the teleological expectations of a globalized fluid space. Far from disappearing, borders and border infrastructures are

proliferating, changing in form, and assuming a central role in how states govern uncertainty, make claims to sovereignty visible, and construct narratives of security against the perceived threats of a globalized era.

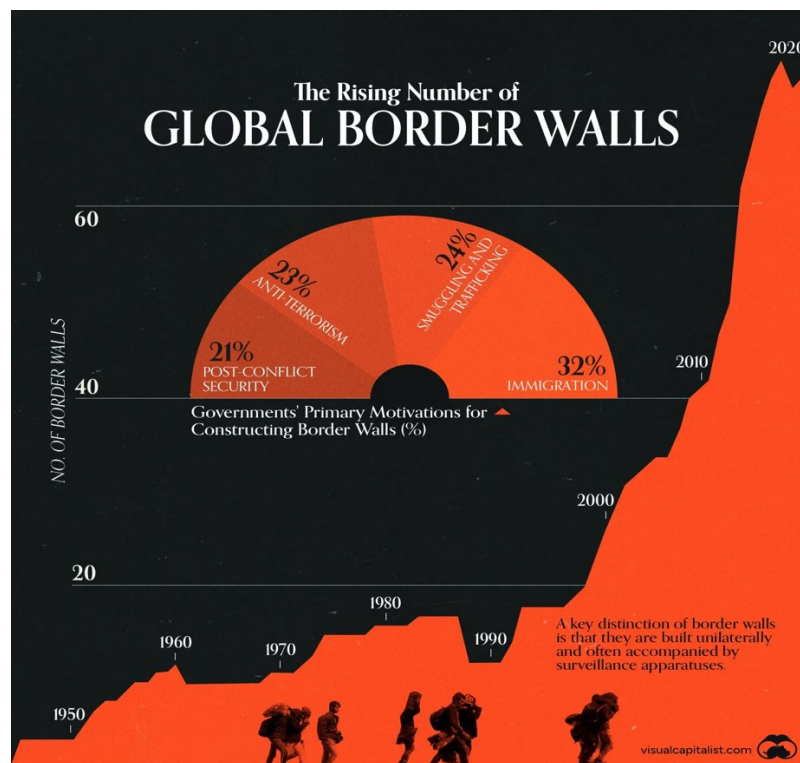


Figure 1. Global growth of border walls over time. Source: Voronoi App (2023), based on Vallet (2022).

The data visualized in Figure 1 highlight the rapid global increase in the construction of border walls over the last decades. While only a handful of such barriers existed at the end of World War II, their number has grown significantly in the contemporary era, with a particularly sharp acceleration after the early 2000s. This trend reflects a broader shift in how states respond to perceived transnational challenges. Among the main drivers identified in recent research is the politicization of migration, which has increasingly been framed as a security concern and used to justify the erection of physical barriers. The visualization therefore illustrates not only the quantitative expansion of walls, but also a qualitative transformation in bordering practices, where material infrastructures are mobilized as visible tools of migration control and territorial assertion. In this sense, the proliferation of barriers reflects not only localized tensions, but also a wider transformation in how states conceptualize sovereignty,

mobility, and security in an era marked by uncertainty. Within this context, the thesis seeks to examine border walls not merely as material, but as complex geopolitical instruments. They are not static but "performative" devices through which state power intervenes in space, determines who may cross, defines who belongs and who is excluded, and organizes hierarchies of mobility and immobility. The underlying hypothesis is that physical barriers are not simply technical responses to security concerns or to the management of cross-border flows; rather, they constitute political and symbolic choices that reflect worldviews, collective fears, and models of coexistence (or separation) between different populations.

From this perspective, the wall can be understood as a "theatre of sovereignty," a concept developed by Wendy Brown (2010) to describe how contemporary states use border walls to stage and materialize their authority. Rather than simply enforcing territorial control, walls make sovereignty visible, projecting images of protection and order even in contexts where state power is increasingly fragmented. The border thus emerges not as a neutral line, but as a lived, traversed, and constantly contested space. A complementary perspective is offered by Nicholas De Genova's concept of the "border spectacle", which emphasizes the performative dimension of contemporary bordering practices. In this view, borders operate not only as mechanisms of territorial control, but also as sites of visibility where sovereignty is enacted through surveillance, enforcement, and exclusion (De Genova, 2011). Walls, patrols, and militarized infrastructures therefore function not merely as deterrent devices, but also as symbolic performances that communicate authority and control to broader audiences. In this way, contemporary bordering practices appear to be as much about representation and visibility as they are about territorial enforcement.

A growing body of recent literature invites us to understand borders as dynamic processes and relational landscapes, where mechanisms of control, everyday practices, and political imaginaries intersect and shape one another (Nail, 2016; Brown, 2010; Dodds, 2021). In this perspective, the border is no longer conceived as a static edge, but rather as a "borderland"—a concept pioneered by Gloria Anzaldúa (1987) and later expanded in political geography to describe a zone of constant transition. Here, the physical barrier represents only the most visible layer of a much deeper socio-political stratification. This stratification functions through what Mezzadra and Neilson (2013)

term the "multiplication of borders": the border does not merely block movement, but filters, intensifies, and diversifies it, creating a complex thickness where legal status, economic vulnerability, and social rights are constantly negotiated. Consequently, the borderland emerges as a "thick" space where the rigid sovereignty of the state meets the fluid reality of transboundary life.

Along these lines also moves the work of Enrica Giaccaglia (2024), a cultural geographer specializing in transboundary landscapes, who interprets border areas as places where the boundary is not only a line of fracture but also a potential space of interaction, contamination, and coexistence between human and non-human actors. Building on this theoretical framework, the thesis defines one general objective and a series of specific objectives. The general objective is to analyze how different types of physical barriers - military, security-oriented, ecological, symbolic, or aimed at cross-border cooperation - function as geopolitical instruments within contexts marked by conflict, tension, or practices of territorial control. Through the comparison of the selected case studies, the thesis aims to highlight how these barriers make visible new ways of exercising control, defining threats and protections, and giving both material and symbolic shape to contemporary borders.

From this general objective follow the following specific objectives:

1. Analyse the political, strategic, and discursive reasons that lead to the construction of physical barriers. This objective concerns the phase preceding the erection of a barrier, and therefore the decision-making process. The thesis aims to investigate how states and political actors construct the perception of a threat and frame the wall as a legitimate and necessary response. The analysis seeks to understand which fears, interests, or strategic priorities are mobilised - from the control of irregular migration to the management of contested territories, from the protection of fragile ecosystems to the need to visibly assert sovereignty. The focus is not limited to official motivations, but considers how these arguments intersect with specific historical, identity-based, and geopolitical contexts.

2. Examine the functions that barriers perform once they are built. This objective concerns the subsequent phase: what the wall concretely does on the ground. Barriers

may exercise military control, regulate migratory flows, protect strategic infrastructure, or contribute to the construction of national identities in opposition to a perceived threatening “other.” The thesis seeks to distinguish between what the wall claims to do and what it effectively produces, identifying contexts in which military, security-oriented, ecological, or symbolic functions prevail, and cases in which the infrastructure operates primarily at a narrative or representational level.

3. Analyse the territorial, social, and ecological effects of barriers. Every barrier reshapes the territory and affects the daily lives of the communities inhabiting it. The analysis considers both material impacts - such as the fragmentation of ecosystems, the transformation of mobility routes, or the separation of communities once integrated - and symbolic impacts, which influence perceptions of the border, collective memories, and local imaginaries.

4. Compare heterogeneous cases to identify recurring patterns and differences. Through the comparative analysis of military, security-oriented, ecological, cooperative, and symbolic barriers, the thesis aims to highlight both recurring elements - regarding justifications, forms, and effects - and differences arising from distinct historical and political contexts. The comparative approach makes it possible to identify models of border governance that transcend the sole logic of closure.

5. Reflect on the transformation of the concept of the border in the twenty-first century. The final objective, of a more theoretical nature, examines how borders are changing in the contemporary world. The thesis seeks to understand whether the border remains a simple line separating an “inside” from an “outside,” or whether it has acquired the thickness of a complex space shaped by negotiations over rights, identities, forms of coexistence, and environmental conflicts. The goal is to assess whether contemporary walls reinforce classical geopolitical categories or contribute to transforming them.

Research Questions

To translate these objectives into a concrete research trajectory, the thesis is structured around a set of research questions that serve as the analytical thread of the study:

1. Which political, strategic, and discursive arguments lead states to present the construction of a physical barrier as a legitimate response to situations of conflict, tension, or uncertainty?
2. What functions do barriers effectively perform once they are in place, and how do they intervene in dynamics of security, territorial control, and the management of cross-border flows?
3. What differences emerge among barriers of a military, security-oriented, ecological, cooperative, or symbolic nature, and to what extent do these differences shape the meanings, uses, and perceptions of the border?
4. What territorial, social, and ecological effects do barriers produce on border landscapes and on the communities that inhabit them?
5. What do the selected case studies reveal about contemporary transformations of the border, understood both as a political institution and as a lived and negotiated space?

1.2 The Importance of Studying Borders in the Twenty-First Century

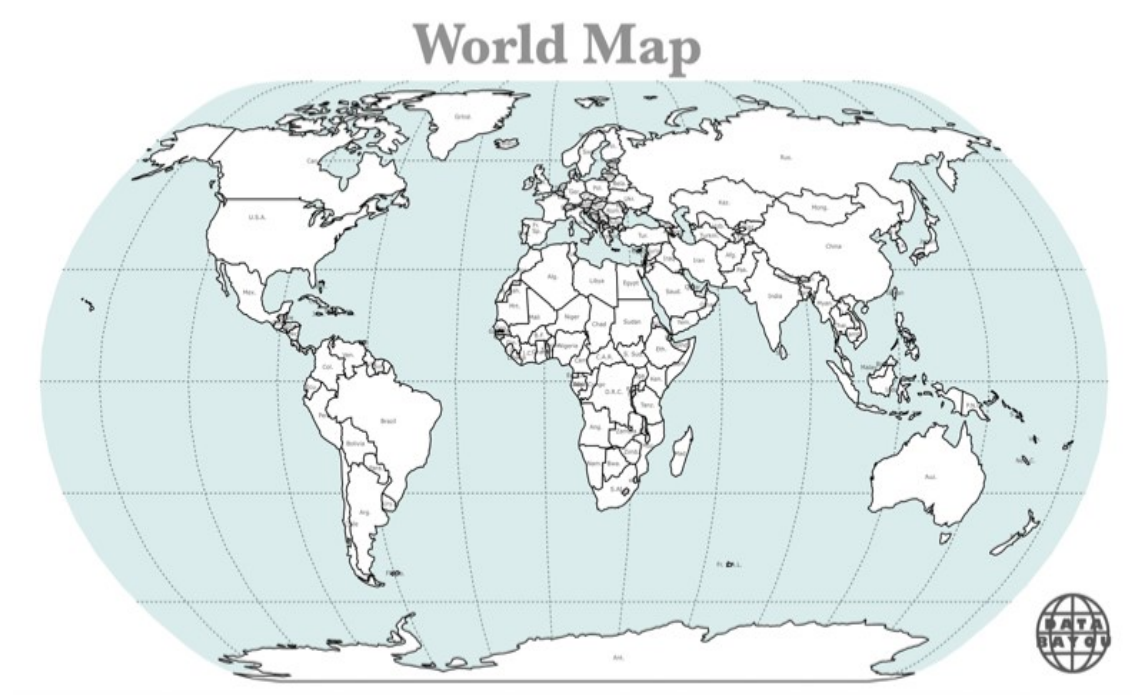


Figure 2. Contemporary world political map and the global configuration of sovereign borders. Source: Databayou (2025).

The map illustrates the contemporary geopolitical configuration of the international system, currently composed of 193 UN member states (United Nations, 2025) and several additional partially recognized entities. While no official count of international boundaries exists, academic estimates suggest that the global state system includes approximately 300–315 land borders between sovereign states. This cartographic representation highlights the density and fragmentation of contemporary territorial organization, particularly in regions shaped by colonial legacies, geopolitical realignments, and post-Cold War state formation. Beyond its descriptive value, the map provides a structural baseline for understanding the scale of bordering practices in the twenty-first century. Recent research suggests that around 70 international borders are now reinforced by physical barriers, indicating a growing tendency toward the materialization of territorial divisions (Vallet, 2014).

Rather than presenting borders as static lines, the visualization underscores the extent to which contemporary geopolitics remains deeply structured by territorial demarcation, offering a global frame within which the subsequent analysis of border fortifications can be situated.

Examining borders in the twenty-first century means addressing their persistent centrality within contemporary geopolitical dynamics. Rather than fading in relevance, borders continue to shape how power is organized and exercised across space. They influence security practices, structure political imaginaries, and define the spatial frameworks through which states articulate sovereignty, belonging, and exclusion. For this reason, borders remain key analytical lenses for understanding the spatial dimensions of conflict and governance in the contemporary world.

A first reason for the relevance of border studies lies in the long historical trajectory of boundary-making. Walls and fortifications have accompanied human history for millennia, from the walls of Jericho to the defensive systems of classical and imperial civilizations (Dodds, 2021). However, the idea of clearly defined international borders is a relatively recent development. In pre-modern societies, territorial organization often relied on fluid frontiers rather than sharply demarcated boundaries. Empires such as Rome governed expansive and porous borderlands, where structures like Hadrian's Wall functioned less as fixed dividing lines and more as instruments for regulating movement and projecting authority. It was only with the emergence of the modern state system, particularly after the Peace of Westphalia (1648), that borders began to be conceptualized as precise lines marking sovereign territorial authority.

This historical evolution highlights that borders are not natural or immutable features, but political constructions shaped by changing forms of power, governance, and territorial imagination. The history of borders is therefore one of both continuity and transformation, in which the desire to delimit and protect coexists with the awareness that no boundary is ever entirely fixed or impermeable. This historical perspective is complemented by early geographical scholarship that conceptualized borders not merely as lines, but as dynamic spatial processes. Hartshorne (1950), for instance, emphasized the functional dimension of boundaries, interpreting them as evolving outcomes of political organization rather than fixed natural divisions. Building on this relational understanding, Raffestin (1980) later reframed borders as expressions of

territoriality, shaped by power relations, symbolic practices, and spatial control. Together, these perspectives highlight how borders should be understood not only as material demarcations, but as socio-political constructions embedded in broader processes of territorial production.

A second element concerns the more recent discontinuity. In the 1990s, during the height of globalization optimism, political and economic discourse was strongly influenced by the idea of a progressively “borderless” world. One of the most influential contributions to this debate was Kenichi Ohmae’s *The Borderless World* (1990), in which he argued that globalization was fundamentally reshaping the spatial organization of power and economic activity. According to Ohmae, the traditional nation-state was gradually losing centrality, as global markets, technological innovation, and transnational flows of capital and information were increasingly seen as eroding the relevance of territorial borders. In his analysis, economic regions increasingly operated beyond national frameworks, driven by what he described as the interconnected dynamics of investment, industry, information, and consumers. Within this perspective, borders appeared less as functional boundaries and more as residual structures inherited from an earlier geopolitical order. The dominant narrative of the period therefore emphasized liberalization, economic integration, and the progressive erosion of territorial barriers.

However, subsequent developments have called this vision into question. Rather than fading away, borders have re-emerged as central instruments of political control and spatial governance. The contemporary proliferation of walls and fortified boundaries can thus be interpreted as a reaction to the very processes of globalization that once seemed to render them obsolete. Today, the situation has changed profoundly. Contemporary borders are no longer limited to fences or checkpoints, but are embedded within complex technological and institutional systems. As Dodds (2021) observes, border security has evolved into a multi-layered assemblage combining physical barriers with surveillance infrastructures such as drones, radars, biometric technologies, and maritime monitoring systems. At the same time, the border has become an expanding field of economic investment. Public–private partnerships, defense contractors, and technology firms are increasingly involved in the development of security infrastructures, while the privatization of detention and

migration management has further blurred the line between governance and market interests. In this sense, borders are not only geopolitical lines but also economic frontiers, sustaining entire industries linked to surveillance, mobility control, and data-driven security. Studying borders today therefore also requires asking who benefits from these transformations, which actors gain power through the expansion of security infrastructures, and which populations are rendered more vulnerable by the growing materialization of exclusion.

A third reason concerns the geopolitical and strategic dimension. Borders are constantly mobilized within regional disputes: from the United States–Mexico border, to Turkey’s role as a threshold power between the Middle East and Europe, to the tensions in the South China Sea, where cartography, maritime law, and official maps are used as tools to legitimize sovereign claims. In such contexts, sovereignty is exercised not only on the ground but also at the level of representation: maps, institutional videos, and school textbooks help construct a border imaginary that teaches citizens to perceive certain territories as “naturally” their own and others as a threat, a loss, or a historical wound. Historical research shows that the relationship between borders and violence spans the long *durée*, and that many lines of separation are the result of conflictual processes that continue to function as scars within collective memory (Noli, 2025). The very idea of “recovering lost territories” fuels nationalism and irredentism, contributing to making borders particularly sensitive and politically charged spaces.

A further reason concerns the cultural and everyday dimension of borders. Geopolitics does not exist only in international treaties, but also in school classrooms, television news, textbooks, and ordinary discourse. Borders and maps are often presented as natural and self-evident facts, and citizens learn from an early age to recognize “contested territories,” “lost lands,” and “external threats.” The literature on banal nationalism has shown how states continuously reproduce the idea of the border through seemingly neutral and routine practices (Bilig, 1995). Rather than emerging only in moments of crisis, national belonging is reinforced through everyday symbols and narratives that normalize the existence of territorial divisions. Flags on public buildings, maps in school materials, weather forecasts centered on the national territory, and media language all contribute to embedding the nation within daily

perception. From this perspective, borders are not only geopolitical markers but also cultural constructions that shape how individuals imagine belonging and difference. By operating at the level of the ordinary, banal nationalism makes borders appear timeless and unquestionable, even though they are historically contingent and politically constructed. Studying borders therefore also means examining how these subtle processes of normalization contribute to shaping collective imaginaries and how they can be politically mobilized in moments of crisis or heightened insecurity.

A fifth element, closely connected to this thesis, concerns the territorial and ecological dimension of border barriers. Several scholars focus on the environmental impacts of walls: fences that fragment habitats, disrupt migratory corridors, and transform entire regions into spaces of continuous surveillance (Dodds, 2021). Environmental campaigns against the wall on the United States–Mexico border have, for instance, highlighted the potential damage to protected areas such as the Santa Ana National Wildlife Refuge. In such cases, the border infrastructure is not only a political decision but a profound intervention in the landscape, requiring land clearing, permanent lighting, and new patrol roads. This issue is also developed by Giaccaglia, who analyses borders as landscapes where human and non-human elements intersect, showing how the construction of walls or, conversely, the creation of transboundary parks produces different forms of coexistence or exclusion. In the case of the Białowieża Forest, the militarisation of the border between Poland and Belarus overlaps with a valuable ecosystem, generating a constant tension between security logics and environmental protection.

Studying borders therefore also means examining how security policies reshape ecological landscapes and which forms of life are rendered more vulnerable as a result of these choices. A final reason for which the study of borders is indispensable concerns the ethical–political dimension: borders are devices that produce lives of varying degrees of precarity. Statistics on deaths at frontiers, images of shipwrecks in the Mediterranean or bodies in the desert, and refugee camps on the margins of Europe or Southeast Asia all remind us that the border is not an abstract place, but a mechanism that decides who may move, who may be received, and who may be abandoned. Symbolic images, such as that of little Alan Kurdi, have helped expose the harshest side of border policies and highlight the responsibilities of political decision-makers.

Considering these elements, the study of borders in the twenty-first century is not a purely theoretical exercise, but a way of bringing into relation historical, geopolitical, economic, environmental, and human dimensions. It allows us to understand:

- how states define themselves and their “others”;
- how power materializes in space through walls, fences, and surveillance devices;
- how security logics intersect with economic and industrial interests;
- how border landscapes become sites of political, ecological, and social experimentation;
- how people’s lives are profoundly shaped by processes of bordering, debordering, and re-bordering.

In this context, the thesis focuses on a set of emblematic cases that highlight the plurality of contemporary borders: military barriers, security devices, experiments in cross-border cooperation, and artistic practices that attempt to reconnect what the wall has separated. The importance of studying borders therefore lies not only in describing lines and walls, but in the ability to use these examples to gain deeper insight into the political, social, and territorial transformations of our time.

1.3 Comparative Methodology and Criteria for Case Selection

In this thesis, I adopt a qualitative and comparative methodology, which makes it possible to relate geographical and political contexts that are very different from one another, without reducing them to a single explanatory model. Instead, the aim is to identify recurring patterns, differences, and shared tensions. The starting point is to conceive the border not as a simple line, but as a process and a landscape: a space shaped by practices, discourses, conflicts, and forms of coexistence. The idea of the border as a dynamic process - one that simultaneously separates and connects - is central to contemporary border theory (Nail, 2016), as is the attention to geographies of power and to the narratives that render certain borders “natural” and others “problematic” (Brown, 2010; Dodds, 2021). Within this framework, Giaccaglia’s perspective is also relevant: she describes border landscapes as places where the boundary is at once a fracture, a filter, and an opportunity for interaction.

From an operational perspective, the analysis is based primarily on:

- secondary sources: key books on the geopolitics of borders and contemporary walls (Dodds; Brown; Foucher; Noli), as well as academic articles in political geography and border studies. Alongside contemporary scholarship, the analysis also engages with foundational contributions from political geography, including classical reflections on territoriality and spatial organization (e.g. Hartshorne, 1950; Raffestin, 1980), which provide a conceptual background for understanding the historical evolution of borders as political and spatial constructs;
- articles from journals and think tanks (such as contributions published in *Limes*, and reports by agencies like Frontex, UNHCR, and IOM), which are useful for understanding the links between academic production and public debate;
- institutional documents and materials related to the construction and management of border barriers (government statements, international agreements, official maps, websites of transboundary parks);
- critical, cartographic, or artistic contributions (such as the Teeter-Totter Wall and the geopolitical mapping practices of Peter Fend), which allow the border to be interpreted not only as a physical infrastructure but also as a visual and conceptual construct shaped by representation, imagination, and spatial narratives.

This is not an empirical fieldwork-based study in the strict sense, but rather a documentary and interpretative investigation that combines critical reading of sources, comparison across different cases, and the use of theoretical concepts as analytical tools.

A comparative approach has been adopted because the objective is not to analyse a single border in depth, but rather to understand what different walls and barriers—military, security-oriented, ecological, symbolic—collectively reveal about how borders operate in the twenty-first century.

Comparing different cases makes it possible to:

- observe how similar motivations (security, flow control, territorial defence) result in very different infrastructures;
- highlight how distinct historical and political contexts shape the ways in which a barrier is built, perceived, and contested;
- bring to light not only logics of closure, but also experiments in cooperation or in the “re-use” of the border, as in the case of transboundary parks or artistic installations.

The underlying idea is that comparison should not flatten differences between cases, but rather bring out patterns and tensions: who is protected and who is excluded, which narratives are mobilized, and which actors (state, economic, local, international) have a voice in decisions concerning the border.

The case studies were chosen according to a set of criteria:

1. Diversity of barrier function: cases were selected to represent different functions of borders and barriers:

- an ecological–security barrier (the Białowieża Forest between Poland and Belarus);
- an example of cross-border cooperation functioning almost as an “anti-wall” (the Binntal–Veglia–Devero Park between Italy and Switzerland);
- a military and defensive barrier in a context of frozen conflict (the Moroccan berm in Western Sahara);
- a fortified post-colonial border shaped by migration dynamics (India–Bangladesh);
- a wall highly charged with political, media, and symbolic meaning (the US–Mexico border, including the Teeter-Totter Wall project);
- a border where the physical barrier has become above all a mental wall and a site of memory (East–West Germany after reunification).

2. Geopolitical and conflict-related relevance: each case is situated in an area where the border is connected to a medium- or long-term conflict or tension: unresolved territorial disputes, colonial legacies, migration dynamics, political or military crises. This makes it possible to analyze the wall not as an isolated infrastructure but as part of a broader geography of conflict.

3. Availability of significant literature: contexts for which a sufficient body of scholarly work exists were prioritised, allowing for the triangulation of diverse sources: geopolitical analyses, case studies, journal articles, reports, and cartographic materials. In some cases—such as Białowieża or Binntal–Veglia–Devero—Giaccaglia’s work provides a valuable starting point for interpreting borders as complex landscapes (Giaccaglia, 2024).

4. Balance between well-known and less-studied cases, including a widely discussed and highly mediatised border, such as the US–Mexico border, alongside cases that receive less public attention, such as the Western Sahara berm or the Binntal–Veglia–Devero Park, helps avoid a thesis focused solely on “the usual walls” and situates the analysis within a broader and more nuanced discussion on contemporary borders.

Role of theory in the interpretation of cases

Theory does not enter the thesis as a separate block detached from reality, but rather as an interpretative lens that is continually applied to the analysis of the cases. Reflections on sovereignty and walls, on the long *durée* of borders and their political construction, on new forms of bordering and border security, together with the perspective of borderscapes (Rajaram & Grundy-Warr, 2007), serve to:

- avoid a purely descriptive reading of barriers;
- hold together the material dimension (the wall, the fence, the berm) and the symbolic dimension (discourses, maps, memories);
- link the space of the border to the major themes that shape contemporary international relations: security, migration, identity, environment, and the political economy of security.

In this sense, the comparative methodology adopted is not merely a way of “lining up” different cases, but rather an attempt to construct, through them, a broader interpretative framework for understanding the role that walls and barriers play in the contemporary world.

2. Theoretical and conceptual framework

Geopolitics of Borders and Theories of Territoriality

This chapter develops the theoretical and conceptual framework that underpins the analysis of contemporary border barriers. Building on the research objectives outlined in Chapter 1, it examines the main debates within political geography and critical geopolitics concerning borders, territoriality, and sovereignty. The chapter clarifies the key concepts employed in the thesis and outlines the analytical lenses through which the selected case studies will be interpreted.

The study of borders today lies at the intersection of geopolitics, political geography, and theories of territoriality. Within this interdisciplinary field, borders are not approached primarily as empirical objects but as analytical categories through which spatial power can be understood. Rather than treating borders as self-evident features of the international system, contemporary scholarship conceptualizes them as historically contingent institutions shaped by practices of governance, representation, and spatial ordering (Foucher, 1991). From this perspective, borders function as key mechanisms through which sovereignty becomes spatially intelligible. Foucher emphasizes that borders do not simply separate territories but actively structure geopolitical relations, stabilizing political authority while reflecting asymmetries of power. This understanding moves beyond purely descriptive accounts and frames borders as instruments of territorial organization embedded in broader regimes of state formation and international ordering. Parallel to this, studies on bordering have highlighted that borders are not merely lines but ongoing processes (Newman, 2006; Paasi, 1998). This approach also helps ground territoriality more precisely, drawing on Sack's widely used definition: territoriality is a spatial strategy through which actors seek to influence and control people and resources by controlling area (Sack, as cited in Paasi, 1998).

Newman similarly frames "bordering" as a research agenda attentive to demarcation and re-closing practices, borderlands, and the conceptual vocabulary through which borders are enacted and contested across disciplines (Newman, 2006). From this perspective, the concept of 'borderwork' (Rumford, 2008) provides a more nuanced lens: borders are continuously created, reproduced, and transformed through security

policies, public representations, administrative norms, and everyday practices that determine who belongs, who may cross, and who is excluded.

A major critique of traditional understandings of territoriality has emerged within critical geopolitics, which emphasizes the limitations of assuming an automatic alignment between power and territory. Scholars have challenged the idea that the state should be conceptualized as a spatial container, arguing that this “territorial trap” obscures the complexity of transnational relations and the reconfiguration of power in the contemporary world (Agnew, 1994). Recent studies have also deepened the historical and conceptual foundations of territoriality, showing that territory is not a pre-given entity but a political-legal construction shaped by practices of measurement, administration, conquest, and representation (Elden, 2013). This approach reveals that modern borders are the outcome of long-term, layered processes rather than “natural” or immutable divisions. Building on these theoretical insights, contemporary scholarship has increasingly shifted attention from borders as abstract demarcations to borders as material practices. They function as multidimensional geopolitical instruments embedded in broader political, economic, ecological, and symbolic configurations (Brown, 2010; Dodds, 2021). Barriers operate simultaneously at various scales- local, national, regional, and global - and their meanings and effects cannot be reduced to the material presence of concrete, fencing, or surveillance infrastructure. They are deeply political objects, continually mobilized to define threats, perform sovereignty, reorganize mobility, and articulate narratives about identity, belonging, and exclusion. In contemporary geopolitics, barriers have re-emerged as central features of territorial governance. This resurgence has occurred not only along traditional geopolitical fault lines, such as those shaped by long-standing military tensions or disputed borders, but also in regions previously imagined as zones of openness, globalization, or cross-border interdependence.

The proliferation of border walls since the early 2000s illustrates how states increasingly rely on physical infrastructures to address anxieties related to migration, security, territorial competition, and cultural cohesion (Vallet & David, 2012; Jones, 2016). As such, walls must be understood as hybrid objects that combine materiality and symbolism, coercion and communication, exclusion and political performance.

These perspectives show that borders should be understood as:

- spatial and political institutions that delineate the extent of state sovereignty;
- symbolic instruments through which states respond to perceptions of insecurity and fragmentation;
- dynamic processes of territorial, identity-based, and normative production;
- historical constructions of power, rather than natural facts;
- elements that do not necessarily coincide with the actual configurations of global power.

The next session explores four main functions of contemporary border barriers - securitarian, military, ecological, and symbolic - highlighting how they overlap, reinforce each other, or come into tension depending on the context. This analytical framework provides the basis for understanding the selected case studies and for identifying both convergences and divergences in the geopolitical uses of border infrastructures.

2.1 Conceptual Clarifications and Functions of Contemporary Border Barriers

Before examining the functions that border barriers perform, it is necessary to clarify the terminology adopted in this thesis. In both public discourse and policy documents, concepts such as border, boundary, frontier, wall, and barrier are frequently used interchangeably. In analytical terms, however, these notions refer to different dimensions of spatial ordering, sovereignty, and mobility governance, and their distinction matters for interpreting how contemporary bordering practices operate (Paasi, 1998; Newman, 2006; Elden, 2013). This configuration should not be seen as natural or timeless, but as the outcome of specific historical transformations that gradually redefined the relationship between power and space. Long before the emergence of the modern state, political entities already relied on spatial systems to organize control and regulate movement. The Roman *limes*, for example, did not function as a rigid dividing line but as a managed frontier combining military defense, trade regulation, and administrative oversight. Rather than fully separating inside and

outside, it structured gradients of authority across imperial borderlands. This historical precedent highlights that borders have long operated as spatial regimes rather than simple lines, anticipating contemporary configurations in which walls and surveillance infrastructures form part of broader systems of governance (Dodds, 2021).

A major shift occurred with the consolidation of the modern state system. The modern understanding of borders as sharp and territorially fixed lines is often traced back to the Peace of Westphalia (1648), which consolidated the principle of territorially bounded sovereignty within the emerging state system. By linking political authority to a clearly delimited territorial space, the Westphalian settlement contributed to transforming borders into markers of exclusive jurisdiction rather than fluid zones of influence. The legal centrality of borders becomes fully explicit in modern international law. Their relevance emerges clearly in the classical criteria of statehood codified in the Montevideo Convention on the Rights and Duties of States (1933). Article 1 of the Convention defines the essential attributes of a state as follows:

“The state as a person of international law should possess the following qualifications: (a) a permanent population; (b) a defined territory; (c) government; and (d) capacity to enter into relations with the other states.” (Montevideo Convention, 1933, art. 1)

Within this framework, the requirement of a defined territory establishes the foundational link between sovereignty and spatial demarcation. Borders thus function as the limits within which jurisdiction is exercised and political authority becomes territorially bounded. Legal scholarship has repeatedly emphasized this relationship. As Kesby (2007) argues, boundaries are “integral to sovereignty,” since the exercise of state power is inherently territorial. Taken together, these historical and legal trajectories clarify how the modern border should be understood in this thesis: not as a natural line, but as a historically contingent institution that crystallizes political authority in spatial form. In this sense, the term border is used here to indicate the political mechanism through which territorial states organize jurisdiction, regulate mobility, and structure inclusion and exclusion.

By contrast, boundary is generally employed to refer to the line of separation itself, either in a legal-cartographic sense (as an officially defined demarcation) or in a

symbolic sense (as a marker of distinction). In geographical terms, a boundary can be understood as a real or imaginary line separating spatial entities, sometimes following natural features such as rivers or mountain ranges (National Geographic, 2024). Boundaries may therefore take different forms — natural, political, or cultural — depending on the processes through which spatial divisions are produced. While the boundary may appear as a precise line, the border is often experienced as a thicker zone, shaped by checkpoints, surveillance systems, administrative procedures, and differential access to mobility (Paasi, 1998). The concept of frontier carries a different historical and conceptual meaning. Rather than denoting a stable demarcation, a frontier often refers to a shifting space of expansion, contestation, or encounter. Etymologically, the term derives from the Latin *frons* (forehead or front), later evolving through the Old French *frontière* to indicate a forward edge or advancing line. This linguistic origin reflects the inherently dynamic nature of frontiers, understood not as fixed limits but as moving zones oriented toward expansion. Frontiers are commonly associated with imperial and colonial histories, where territorial control is not fully consolidated and the “edge” is imagined as a space of opportunity, insecurity, or civilizational struggle. Even in contemporary contexts, the frontier lens is useful when borders are framed as spaces to be “secured,” “tamed,” or “opened,” revealing the ideological narratives that accompany territorial practices (Dodds, 2021).

Border security and border management

A second conceptual distinction concerns the language of border security versus border management. Border security frames the border primarily as a site of threat: irregular migration, terrorism, smuggling, and transnational crime are constructed as risks that justify exceptional measures, increased surveillance, and militarized responses. Within this logic, the barrier becomes both a material instrument of control and a political symbol intended to reassure domestic audiences and demonstrate state capacity (Brown, 2010; Dodds, 2021).

By contrast, border management is often presented as a technocratic and administrative approach focused on regulating movement efficiently rather than simply stopping it. The emphasis is placed on screening, filtering, risk assessment, and selective mobility, frequently through technological tools such as biometric identification, databases, and

surveillance networks. Importantly, border management does not represent an “alternative” to securitization but often operates alongside it, making borders simultaneously more controlled and more differentiated: some mobilities are facilitated, others are restricted or criminalized (Dodds, 2021).

Wall, fence, barrier, and berm

Infrastructures of bordering also require terminological precision. In this thesis, barrier functions as an umbrella term indicating the broader set of physical and technological dispositives designed to shape access to territory and govern mobility. Within this category, a wall generally denotes a continuous and visually imposing structure—often concrete—that communicates closure and separation as much as it restricts movement. A fence is typically a lighter, modular infrastructure that may be easier to expand or relocate and is frequently integrated with surveillance technologies (cameras, sensors, floodlights, drones).

The difference is not only material but also political: walls tend to carry heavier symbolic meaning, whereas fences are more often framed as tools of “management,” even when they produce similar exclusionary effects (Brown, 2010; Dodds, 2021). A berm refers to an earthen defensive construction (often sand or soil) that is generally associated with military logics and territorial control in conflict settings. Unlike a fence or wall presented as migration control, berms are commonly embedded in strategies of separation, deterrence, and the consolidation of de facto boundaries. In these contexts, the barrier is directly tied to a security-military geography and to the freezing of conflict lines (Foucher, 1991; Noli, 2025).

Hardening of borders

The term hardening of borders is used in this thesis to describe the process through which borders become increasingly fortified, technologically equipped, and institutionally reinforced. Hardening does not refer only to building walls or fences: it also includes the expansion of surveillance, the tightening of legal regimes, the multiplication of checkpoints, and the normalization of emergency frames that justify exceptional control practices.

This process is one of the clearest indicators that borders remain central to contemporary statecraft, especially in contexts where globalization is perceived as eroding sovereignty and where mobility becomes politically contested (Brown, 2010; Dodds, 2021).

Border regimes and border assemblages

Finally, contemporary border scholarship often conceptualizes borders as border regimes, systems of laws, institutions, practices, and actors that collectively shape how borders function. This perspective underlines that borders are not “administered” solely by the state: they are produced through interactions among governments, security agencies, private contractors, international organizations, and local actors (Newman, 2006). A closely related concept is the idea of borders as assemblages, meaning heterogeneous configurations of material infrastructures, technologies, legal categories, narratives, and practices that operate together. This approach is particularly useful for analyzing modern “smart borders,” where physical barriers coexist with invisible infrastructures (databases, algorithms, biometric controls) that extend border functions beyond the territorial line, often projecting control outward (pre-entry screening) and inward (internal checks, differentiated rights) (Dodds, 2021). In this sense, borders do not simply separate spaces; they reorganize mobility by sorting subjects, producing hierarchies of access, and governing movement through selection rather than through absolute closure (Nail, 2016).

Clarifying these concepts strengthens the analytical framework of the thesis. Borders are not reducible to a single line, nor are barriers merely technical objects. Rather, they are components of broader geopolitical regimes through which sovereignty is performed, mobility is sorted, and territory is continuously produced and contested. These conceptual distinctions provide the basis for the following sections, which examine how contemporary barriers operate as geopolitical instruments through securitarian, military, ecological, and symbolic functions.

The Securitarian Function

One of the most frequently invoked justifications for constructing border barriers lies in the discourse of security. In many countries, walls are framed as necessary tools to control irregular migration, prevent terrorism, combat transnational crime, and regulate the circulation of goods, people, and capital. The securitization of borders has expanded in parallel with the global diffusion of narratives portraying mobility as a threat and borders as fragile, permeable, and in need of reinforcement (Brown, 2010). Contemporary security practices increasingly rely on a combination of physical barriers and digital technologies, creating what scholars have described as *smart border*: hybrid apparatuses that integrate fencing, drones, infrared sensors, biometric systems, satellite surveillance, and artificial intelligence (Dodds, 2021). In these settings, the wall becomes only one element of a much broader security assemblage supported by states, private contractors, and technological industries. The expansion of the border-security industry has transformed borders into economic frontiers, generating profit opportunities and institutional incentives that normalize the continued reinforcement of control infrastructures. Importantly, walls often serve to reassure domestic publics rather than to prevent movement effectively. As several authors argue, the securitarian wall is also a performative object, designed to communicate political authority, determination, and the capacity to act under conditions of uncertainty (Brown, 2010). It responds to collective anxieties by offering a visible, material symbol of protection, regardless of its actual effectiveness in stopping flows.

The Military Function

Beyond security narratives, many border barriers emerge directly from military tensions, unresolved territorial disputes, or frozen conflicts. In these contexts, walls operate as instruments of territorial control, strategies of defense, and mechanisms of conflict management.

Historically, fortifications have been used to mark territorial claims, delay enemy movements, or protect civilians. In contemporary conflicts, however, barriers often combine military and political objectives: they freeze contested lines, consolidate de facto boundaries, and create new facts on the ground that influence negotiations or peace processes (Foucher, 1991; Noli, 2025). The military wall can function as:

- a buffer zone, separating hostile forces;
- a deterrent, signaling resolve and territorial commitment;
- a control device, enabling the monitoring of movement in and out of contested territories;
- a tool of territorialization, strengthening sovereignty claims.

In some cases, barriers become part of long-term strategies to reshape demographic patterns, secure strategic resources, or reinforce national control over sensitive borderlands. They may also produce asymmetric power relations by granting one actor superior access to surveillance, mobility, and territorial depth. The military function of walls thus reflects the persistent role of territory in global politics, despite narratives of deterritorialization. Barriers make visible the enduring materiality of geopolitical competition.

The Ecological Function

While less widely discussed, the ecological dimension of border barriers has become increasingly central in academic debates and environmental activism. Walls reshape ecosystems, disrupt species migration routes, fragment habitats, and impose irreversible transformations on landscapes (Dodds, 2021). The physical demarcation Enrica Giaccaglia's contribution is crucial here: she conceptualizes borderlands as "ecological and relational landscapes", where human and non-human dynamics intersect (Giaccaglia, 2024). Her analysis highlights how border infrastructures produce environmental conflicts when securitarian logics override ecological concerns. The Białowieża Forest, one of Europe's last primeval woodlands, offers a vivid example: the construction of the Polish–Belarusian barrier introduced heavy machinery, artificial lighting, and continuous patrolling into a UNESCO-protected ecosystem, threatening biodiversity and amplifying tensions between environmental

protection and state security objectives. In other contexts, walls have altered river flows, increased soil erosion, and disrupted delicate desert ecosystems.

The U.S.–Mexico border wall, for example, has raised alarm among conservation organizations for its impact on protected areas, including the Santa Ana National Wildlife Refuge, where the barrier has fragmented habitats essential for species such as the ocelot. Border barriers therefore function as environmental interventions: they reorganize ecological relations, produce new vulnerabilities, and redefine the landscape as a site of political contestation. This reveals how security practices extend far beyond human concerns, reshaping the non-human world as well.

The Symbolic and Narrative Function

No border barrier operates purely through material force. Walls also carry profound symbolic and narrative power, acting as markers of identity, sovereignty, and collective imagination. Their visual prominence transforms them into political statements: they embody territorial authority and demarcate the boundaries between an “inside” that must be protected and an “outside” constructed as dangerous, inferior, or untrustworthy (Paasi, 1998; Billig, 1995). Walls participate in the production of national identity by making the border visible, tangible, and emotionally resonant. They serve as performative devices that dramatize security concerns and reinforce narratives of belonging. In many cases, political leaders mobilize the symbolic value of walls to strengthen electoral legitimacy, unify fragmented publics, or redirect attention away from internal crises.

The symbolic dimension also includes the capacity of walls to generate mental borders—enduring perceptions of division that persist long after the physical structure has disappeared. The East–West German divide illustrates how symbolic boundaries can outlive material infrastructures, shaping memory, cultural identity, and socio-spatial imaginaries. Thus, walls not only exclude or regulate; they tell stories, cultivate emotions, and produce geopolitical meaning. They are, fundamentally, narrative technologies as much as physical ones.

The securitarian, military, ecological, and symbolic functions reveal that border barriers are multifunctional geopolitical devices. They operate through a combination of material control, political messaging, territorial strategies, and ecological

transformations. Their power lies precisely in this hybridity: walls do not simply block or permit movement; they structure how territories are imagined, governed, contested, and inhabited. Understanding barriers in this multidimensional way provides a crucial foundation for analyzing the case studies in the following chapters. It allows us to identify not only what walls do, but what they mean to states, to populations, and to the landscapes they reshape.

2.3 Material Borders vs. Symbolic Borders

Borders are often understood primarily as material structures: lines traced on maps, walls erected on the ground, fences, checkpoints, surveillance towers, or gates controlling passage. Yet contemporary border studies have demonstrated that borders possess a dual nature. They operate simultaneously as material infrastructures and symbolic constructs, shaping imaginaries, identities, and political narratives that extend far beyond the physical sites of demarcation (Paasi, 1998; Newman, 2006). The interaction between these two dimensions, material and symbolic, is central to understanding how borders function as geopolitical instruments. While material borders seek to regulate mobility through visible infrastructures, symbolic borders produce meaning, establish distinctions between “us” and “them,” and anchor collective identities. These symbolic elements can persist independently of the physical presence of a wall, and sometimes even become more influential than material boundaries themselves. The German case is exemplary: decades after reunification, the former East–West border continues to shape social attitudes, economic disparities, and cultural representations. This demonstrates that borders, once internalized, can outlive their material infrastructures and continue to structure lived geographies.

Material borders refer to the tangible elements through which states attempt to regulate the circulation of people, goods, and information. These include walls, fences, trenches, patrol roads, surveillance systems, and checkpoints. Their primary function is to control access to facilitate or deny entry, filter mobility, and mark state authority spatially.

Material borders operate in three main ways:

1. As physical obstacles, designed to delay, deter, or prevent movement.
2. As administrative interfaces, where documents, biometric data, or legal statuses determine admissibility.
3. As technological assemblages, integrating sensors, drones, algorithms, and databases to monitor and predict cross-border flows.

These infrastructures do not simply “exist”; they produce space. They reorganize landscapes, reshape local economies, and impose new rhythms and patterns of mobility. Their presence transforms everyday life for borderland communities, altering where people can walk, graze livestock, work, shop, or maintain social ties. In this sense, material borders are not only political objects; they are spatial and social interventions.

Yet materiality alone does not explain the power of borders. A wall may fail to stop crossings, but still succeed politically by reinforcing narratives of security or sovereignty. This reveals the need to understand the symbolic dimension as fundamentally intertwined with the physical.

Symbolic borders refer to the ideas, discourses, and collective representations that define who belongs to a political community and who is positioned outside it. They operate through language, education, media, national myths, and political rhetoric. As suggested by studies on nationalism, everyday cultural practices continually reproduce symbolic boundaries, what Michael Billig called “banal nationalism” (Billig, 1995).

Symbolic borders achieve several key functions:

- They shape national identity, distinguishing insiders from outsiders.
- They legitimize political action, making walls, fences, or surveillance appear necessary.
- They translate complex insecurities into simplified spatial categories, often reducing political, economic, or social issues to questions of territorial control.
- They persist over time, even when material borders are dismantled or rendered obsolete.

This symbolic dimension is essential to understanding why some societies demand walls even when empirical evidence shows they are ineffective. Walls serve as powerful political metaphors: they embody protection, order, and stability, while attributing threats to an external “other.” Political leaders frequently mobilize these symbolic meanings to galvanize support, redirect internal tensions, or reinforce sovereignty through spectacles of security. Symbolic borders also shape the emotional geographies of a society. They produce fear, pride, resentment, or nostalgia. In some cases, they create “mental maps” that divide populations long after political or military divisions have ended. Thus, while material borders regulate movement, symbolic borders regulate meaning.

Although analytically distinct, material and symbolic borders are deeply intertwined. Material structures derive their legitimacy from symbolic narratives, while symbolic boundaries often depend on material infrastructures to acquire visibility and force.

Three dynamics illustrate this interdependence:

1. Materialization of Symbolic Narratives

Discourses about threats, national identity, or sovereignty become materialized in the construction of walls and security infrastructures. The wall gives physical form to anxieties and political claims.

2. Symbolization of Material Infrastructure

Once built, walls acquire symbolic meanings beyond their practical functions. They become cultural icons, political statements, or historical markers. The Berlin Wall, the West Bank barrier, and the US–Mexico wall all exceed their material properties.

3. Mutual Reinforcement

Symbolic narratives justify material barriers, and the presence of barriers reinforces symbolic distinctions. This feedback loop strengthens both forms of bordering. This interdependence underscores why border studies increasingly analyze borders as processes rather than objects (Newman, 2006; Paasi, 1998): as fluid assemblages of material, symbolic, legal, and discursive elements that together shape how territory

and identity are governed.

Understanding the distinction between material and symbolic borders is crucial for interpreting the case studies analysed in this thesis:

- Białowieża: the material fence intersects with symbolic narratives of national security, ecological protection, and geopolitical rivalry.
- Western Sahara: the berm is both a military tool and a symbol of Moroccan sovereignty.
- USA–Mexico: the wall is a political symbol as much as a control infrastructure.
- India–Bangladesh: a material barrier justified through narratives of demographic threat and territorial insecurity.
- Germany East–West: proof that symbolic borders may endure long after material ones disappear.
- Binntal–Veglia–Devero: an example of symbolic reconfiguration in which the border becomes a site of cooperation rather than exclusion.

These cases demonstrate that walls are never “just walls”: they are spatial expressions of broader geopolitical imaginations. The distinction between material and symbolic borders reveals the complexity of contemporary bordering practices. Material infrastructures regulate mobility, reshape landscapes, and enforce state authority, while symbolic borders shape imaginaries, identities, and political emotions. Only by examining both dimensions can we understand how borders function as powerful geopolitical instruments and why they remain central—even in an era ostensibly defined by globalization and interdependence.

3. Case Studies

Before examining each case individually, it is necessary to clarify how the analytical framework developed in the previous chapters will be operationalized. The case studies are not presented as descriptive narratives of specific borders, but as empirical terrains through which the research questions are systematically explored.

Each case will be analyzed through three dimensions, directly derived from the research objectives outlined in Chapter 1 and from the theoretical framework developed in Chapter 2.

First, the analysis reconstructs the historical and geopolitical conditions in which the barrier emerged, combined with an analysis of the political motivations that drove its construction. This section examines how specific events, conflicts, or crises create the conditions for the emergence of a barrier, while also investigating the narratives used to justify it. Particular attention is paid to the relationship between declared motivations — such as security, migration control, or stability — and underlying or implicit drivers, including territorial consolidation, domestic legitimation, geopolitical signaling, or identity politics. By comparing stated and unstated rationales, the analysis highlights how material barriers often embody broader political projects that exceed their official justifications.

Second, the study examines the functional dimension of the barrier once constructed. Rather than treating barriers as static infrastructures, this section analyzes their operative functions on the ground. Drawing on the typology developed in Chapter 2, each case is evaluated in terms of its dominant functional logic — whether primarily securitarian, military, ecological, symbolic, or hybrid.

Particular attention is paid to the relationship between intended and effective functions. In many cases, barriers perform multiple roles simultaneously: they may operate as instruments of territorial control while also producing symbolic effects or restructuring patterns of mobility. This section therefore seeks to identify not only the declared purpose of the barrier but also its practical role within broader regimes of border governance.

Finally, the analysis explores the territorial and socio–environmental consequences generated by the barrier once in place. Rather than treating barriers as passive lines of

separation, this section analyzes how they actively reshape territory and borderland dynamics. Particular attention is paid to their spatial, social, and environmental impacts. Barriers may redirect mobility routes, fragment ecosystems, alter economic patterns, and transform everyday life in border regions. They can produce new spatial hierarchies, intensify inequalities, and reconfigure relationships between center and periphery. In some contexts, barriers also generate long-term ecological disruptions, especially where they intersect with fragile environments or transboundary ecosystems. By focusing on these effects, the analysis highlights how the materialization of borders produces consequences that extend far beyond their immediate security rationale, revealing the broader territorial transformations triggered by contemporary bordering practices.

Poland–Belarus Border (Białowieża Forest)



Figure 3. Location of the Białowieża Forest along the Poland–Belarus border. Source: BBC News 2021.

To situate the case geographically and ecologically, it is important to note the unique location of Białowieża Forest along the Poland–Belarus border. As shown in Figure 3, the Białowieża region covers approximately 1,500 km², it constitutes a remnant of the ancient primeval forest that once stretched across much of Central and Eastern Europe (Jaroszewicz et al., 2019). Its ecological significance is internationally recognized: the Polish section was designated a UNESCO Biosphere Reserve in 1976 and a World Heritage Site in 1979, while since 2014 the entire forest complex has been listed as a transboundary UNESCO site (Blicharska et al., 2020; Brocada & Piana, 2022).

The Białowieża Forest has persisted despite centuries of political transformations in Eastern Europe, it represents one of the oldest and best-preserved forest ecosystems in Europe.

From a historical perspective, the forest has been subject to multiple regimes of control and exploitation. During the Middle Ages and the early modern period, it served as a royal hunting reserve for Polish monarchs, who restricted access in order to preserve wildlife, particularly the European bison (Bobiec, 2012). Following the partitions of Poland in 1795, the territory came under the control of the Russian Empire, alternating between phases of intensive exploitation and environmental protection policies (Blavascunas, 2014).

In the twentieth century, the forest became a theatre of military operations during both World Wars and experienced the consequences of Nazi occupation, consolidating its role as a highly contested borderland (Bieńkowska et al., 2019; Brocada & Piana, 2022). During the Soviet period, the forest continued to function as a hunting reserve and strategic frontier zone, yet its relative peripherality limited large-scale industrial exploitation (Blavascunas, 2014; Brocada & Piana, 2022). After the Cold War, Białowieża became a symbol of transboundary environmental cooperation, although tensions persisted regarding forest governance, particularly between strict conservation and managed exploitation approaches (Niedziałkowski, 2016).

The symbolic value of the forest is not only ecological but also geopolitical. As a borderscape, it represents a liminal space where environmental, political, and identity-related dimensions intersect. The borderscape concept, developed within critical border studies, describes borders not as static lines but as dynamic spaces shaped by practices, discourses, and conflicts (Brambilla, 2015). In this sense, Białowieża exemplifies the transformation of contemporary European borders into complex arenas where security, mobility, and environmental concerns converge (Brocada & Piana, 2022). This dynamic re-emerged forcefully during the 2021 migration crisis, when deteriorating relations between the European Union and Belarus triggered a renewed militarization of the forest.

Several analyses suggest that the Belarusian government facilitated the arrival of migrants from the Middle East, directing them toward the Polish border as a form of geopolitical pressure against the EU (Bryjka & Legucka, 2021; De Luca, 2021).

Poland's response included the deployment of thousands of soldiers and the construction of a physical barrier nearly 200 km long and over 5 meters high, completed in 2022 (Jaroszewicz et al., 2021; Brocada & Piana, 2022).



Figure 4. Barbed-wire fortifications along the Poland–Belarus border during the 2021 migration crisis. Source: The Guardian (2021).

The construction of the wall marked a turning point in the forest's history, transforming a space previously associated with environmental cooperation into a militarized landscape. Recent studies highlight how the border infrastructure disrupts the ecological continuity of the forest, threatening key species such as the European bison, wolves, and lynxes, and fragmenting one of the last high-naturalness ecosystems in Europe (Jaroszewicz et al., 2021; Science, 2021; Blicharska et al., 2020). In the longer term, the Białowieża case fits within a broader trend toward the rematerialization of borders through walls and physical barriers. As noted by Minca and Rijke (2017), the proliferation of border walls in Western democracies reflects a renewed securitization paradigm, in which territoriality is reasserted through material infrastructures that reshape landscapes, mobility, and power relations. Within this framework, the Białowieża Forest represents an emblematic example of how contemporary borders can transform protected natural environments into sites of

socio-environmental conflict, posing new challenges for transboundary governance and biodiversity conservation.

Functional Dimension of the Barrier

Moving beyond its historical trajectory, the Białowieża frontier can be interpreted through a functional perspective that highlights how contemporary borders operate as dynamic political technologies. Rather than merely delineating sovereignty, the Polish–Belarusian barrier performs multiple roles that simultaneously shape security practices, migration governance, geopolitical narratives, and ecological processes. Analysing these functions allows the border to be understood as an operative borderscape, where material infrastructures actively produce spatial and political effects (Brambilla, 2015; Brocada & Piana, 2022).

One of the primary functions of the fortified border is defensive. The construction of the barrier following the 2021 migration crisis reflects the securitization of the EU’s eastern frontier, with Poland framing the wall as a necessary infrastructure to prevent irregular crossings and protect territorial integrity (Jaroszewicz et al., 2021; Science, 2021). The deployment of thousands of soldiers along the border and the installation of surveillance technologies transformed the forest into a militarized landscape, reinforcing the perception of the EU’s external boundary as a frontline of geopolitical tension (Brocada & Piana, 2022). In this sense, the wall operates as a material reassertion of territorial sovereignty in response to perceived hybrid threats.

Beyond its defensive rationale, the border functions as a geopolitical instrument embedded in broader EU–Belarus tensions. The crisis of 2021 has widely been interpreted as a case of “weaponized migration”, in which the Belarusian regime facilitated migrant flows to exert pressure on the European Union (Bryjka & Legucka, 2021; De Luca, 2021). Within this framework, the fortified border becomes not only a protective device but also a symbol of geopolitical confrontation. As Brocada and Piana (2022) argue, the militarization of the Białowieża borderscape reflects how contemporary borders are increasingly shaped by strategic narratives and hybrid warfare dynamics. The wall therefore embodies both material defence and symbolic power within EU external bordering practices.

A further key function is that of spatial filtering. The fortified forest operates as a filtering mechanism that regulates mobility through selective inclusion and exclusion, reinforcing the EU's migration management regime. Migrants stranded in the forest have often been trapped in a liminal zone characterized by repeated pushbacks and legal ambiguity, creating what some scholars describe as zones of "suspended mobility" (Pallister-Wilkins, 2020; Minca, 2020). In this sense, the border does not simply stop movement but reorganizes it, producing spaces of confinement and uncertainty. The transformation of the forest into a zone of humanitarian crisis illustrates how borders function as biopolitical devices governing life, mobility, and vulnerability.

Unlike many other contemporary border walls, the Białowieża barrier cuts through a protected natural ecosystem, generating significant environmental implications. The construction of the wall has fragmented ecological continuity across one of Europe's last primeval forests, potentially affecting species mobility and biodiversity (Jaroszewicz et al., 2021). Scholars have warned that such infrastructures may disrupt migration patterns of large mammals, including bison, wolves, and lynxes, thereby altering long-standing ecological equilibria (Blicharska et al., 2020; Brocada & Piana, 2022). From this perspective, the border also functions as an environmental governance mechanism, redefining conservation practices through the lens of security priorities.

Finally, the Białowieża border performs a symbolic and discursive function by producing new spatial narratives. As emphasized in borderscape literature, borders are not only physical infrastructures but also sites of meaning-making shaped by political discourse and media representations (Brambilla, 2015). The Polish–Belarusian frontier has been framed alternately as a site of defence, a humanitarian tragedy, and an environmental crisis, demonstrating how borders generate competing imaginaries. Brocada and Piana (2022) highlight how the militarization of the forest reshapes perceptions of nature itself, transforming a protected landscape into a space associated with danger, confinement, and geopolitical conflict. The wall thus contributes to the symbolic reconfiguration of both the border and the environment it traverses.

Territorial and Socio-Environmental Consequences

The construction of the Polish–Belarusian barrier and the broader militarization of the Białowieża borderland have generated multidimensional consequences extending across ecological, humanitarian, spatial, and socio-political domains. These impacts highlight how contemporary border infrastructures do not merely regulate mobility but actively reshape landscapes, governance practices, and lived experiences within border regions (Brocada & Piana, 2022).

One of the most immediate and widely discussed consequences concerns ecological fragmentation. The wall disrupts the millennia-old continuity of one of Europe’s last primeval forests, dividing habitats that have historically functioned as a single ecosystem (Jaroszewicz et al., 2021). Scholars warn that the barrier may hinder the migration patterns of key species such as the European bison, wolves, lynxes, and brown bears, potentially leading to long-term biodiversity decline (Blicharska et al., 2020; Science, 2021). Beyond habitat fragmentation, the construction process itself required extensive land clearing and heavy infrastructure deployment, contributing to soil degradation and environmental disturbance in previously undisturbed areas (Brocada & Piana, 2022). In this sense, the border wall represents not only a geopolitical artifact but also an ecological rupture.

The militarization of the forest has also produced severe humanitarian consequences. The reinforcement of border controls has generated a situation in which migrants are frequently trapped in a liminal zone between Polish and Belarusian forces, often subjected to repeated pushbacks and denied access to asylum procedures (Bryjka & Legucka, 2021). Reports by NGOs and scholars describe a “ping-pong” dynamic of expulsions, leaving individuals stranded in harsh environmental conditions with limited access to food, shelter, or medical assistance (De Luca, 2021; Brocada & Piana, 2022). The forest thus becomes a space where geopolitical confrontation translates into embodied vulnerability, reinforcing critiques of contemporary border regimes as sites of humanitarian exception (Pallister-Wilkins, 2020).

Beyond ecological and humanitarian dimensions, the wall has fundamentally altered the symbolic and perceptual landscape of Białowieża. Previously associated with biodiversity conservation and ecotourism, the area has increasingly been reframed as a militarized frontier. The presence of surveillance technologies, restricted zones, and military patrols has reshaped how the forest is experienced and represented, transforming it from a space of environmental regeneration into a site of geopolitical tension (Brocada & Piana, 2022). This process reflects broader patterns observed in border studies, where infrastructural bordering produces new spatial imaginaries that redefine the meaning of frontier spaces (Brambilla, 2015).

The militarization of the border has also generated socio-economic repercussions for local communities. Restrictions on mobility and access to forested areas have negatively affected tourism and traditional economic activities linked to forestry and environmental services (Niedziałkowski, 2016). Moreover, long-standing conflicts over forest governance have been exacerbated by securitization dynamics, as conservation policies become intertwined with security imperatives. Local stakeholders often perceive the transformation of the forest into a fortified frontier as undermining regional development and reinforcing peripheral marginalization (Brocada & Piana, 2022).

Finally, the Białowieża case illustrates broader governance implications tied to the rematerialization of borders. The wall reinforces the externalization of EU migration control and contributes to the normalization of exceptional security measures within democratic contexts (Minca & Rijke, 2017). At the same time, it challenges transboundary environmental governance frameworks that previously relied on cooperation between Poland and Belarus. The tension between conservation and securitization reveals how border militarization can undermine existing regimes of environmental diplomacy, replacing cooperative logics with exclusionary territorial practices (Brocada & Piana, 2022).

The Moroccan Berm in Western Sahara

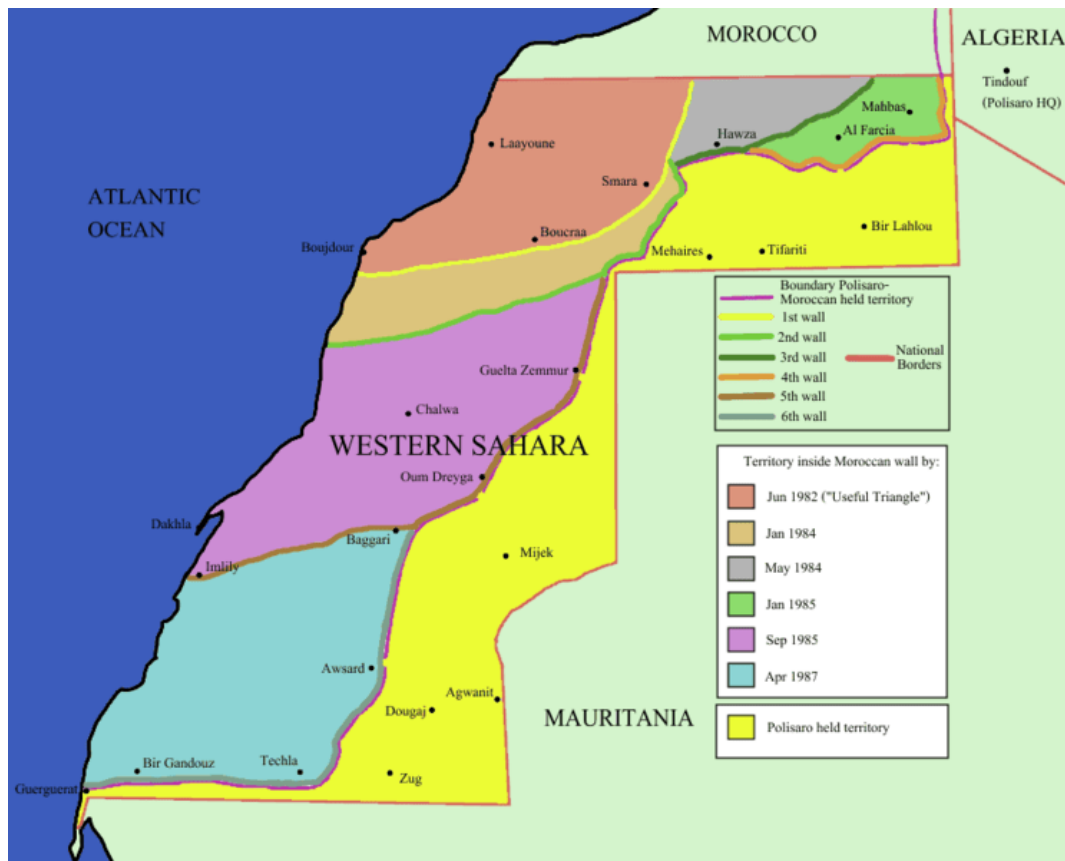


Figure 5. Territorial evolution of the Moroccan berm and division of Western Sahara. The map illustrates the phased construction of defensive walls and the resulting separation between Moroccan-controlled areas and Polisario-held territories. Source: Remove the Wall (n.d.), Construction of the Moroccan Walls, removethewall.org.

The Western Sahara conflict originates in the late phase of European decolonization, when Spain withdrew from its former colony of Spanish Sahara in 1975. The end of Spanish rule created a power vacuum that triggered competing territorial claims, most notably from Morocco and Mauritania, both of which sought to incorporate the territory following Madrid's disengagement (Zunes & Mundy, 2010; Dodds, 2021). While Mauritania later renounced its claims in 1979, Morocco consolidated its presence, framing the territory as part of its historical sovereignty and national

territorial integrity. At the same time, the Sahrawi independence movement, organized around the Polisario Front and later institutionalized in the Sahrawi Arab Democratic Republic (SADR), mobilized armed resistance against Moroccan control. Supported diplomatically and militarily by Algeria, the Polisario framed the conflict within the broader language of anti-colonial self-determination, aligning it with other postcolonial struggles recognized by the United Nations (Jensen, 2005; UN General Assembly, 1963). Since 1963, Western Sahara has been listed by the UN as a non-self-governing territory, a classification that continues to underpin the legal ambiguity surrounding Moroccan sovereignty. The construction of the berm must be understood within the escalation of the armed conflict during the late 1970s and 1980s. As Dodds (2021) notes, Morocco faced persistent guerrilla warfare conducted by Polisario forces operating from rear bases in Algeria and from the sparsely populated desert interior. In response, Rabat progressively built a series of defensive sand walls throughout the 1980s, eventually creating a fortified barrier stretching over 2,700 kilometers across the desert. This system of berms, trenches, radar installations, and minefields effectively partitioned the territory into a Moroccan-controlled western zone and a Polisario-influenced eastern area.

Beyond immediate military necessity, the berm reflected broader strategic motivations. It allowed Morocco to secure economically valuable areas along the Atlantic coast, including major fishing zones and phosphate deposits around Bou Craa, while isolating Polisario mobility inland (Zunes & Mundy, 2010; Dodds, 2021). The barrier thus functioned not only as a defensive structure but as a spatial instrument for consolidating territorial control over the most resource-rich parts of the territory. The 1991 UN-brokered ceasefire froze this territorial division without resolving the underlying sovereignty dispute. Although the ceasefire was premised on a future referendum on self-determination, the vote has never taken place, leaving the berm as the de facto geopolitical line structuring the conflict (UN Security Council, 1991; Mundy, 2012). As a result, the barrier today embodies both an unresolved decolonization process and a stabilized territorial reality, reflecting the gap between international legal frameworks and facts on the ground. From a geopolitical perspective, the persistence of the berm is also linked to broader dynamics of international recognition and strategic alignment. As highlighted by Dodds (2021), the

Western Sahara case illustrates how territorial disputes are shaped not only by local actors but also by external geopolitical calculations. Several states and regional organizations have prioritized strategic partnerships with Morocco — including cooperation on migration control, counterterrorism, and trade — contributing to the prolonged stalemate surrounding the territory's status. In this sense, the berm is inseparable from the wider geopolitics of recognition that continue to shape the conflict.

Functional Dimension of the Barrier

From a functional perspective, the Western Sahara berm cannot be understood as a purely defensive military structure. Rather, it operates as a multi-layered geopolitical infrastructure that simultaneously performs military, territorial, and symbolic functions. This layered functionality reflects a broader characteristic of contemporary border barriers, which rarely correspond to a single strategic rationale but instead condense different logics of control within a single material form (Vallet & David, 2012; Dodds, 2021). At its most immediate level, the berm performs a clear military function. Constructed during the high-intensity phase of the conflict in the 1980s, the barrier was designed to neutralize the mobility advantage of Polisario guerrilla forces, whose strategy relied on rapid desert incursions and cross-border retreat routes. By segmenting the territory through a fortified linear infrastructure composed of sand walls, trenches, surveillance systems, and one of the largest minefields in the world, Morocco effectively transformed an open desert battlespace into a controlled defensive depth (Zunes & Mundy, 2010; Mundy, 2012). In this sense, the berm operates less as a border in the conventional sense than as a militarized spatial technology aimed at fixing a fluid conflict geography into a stable line of control.

However, reducing the berm to its tactical military role would obscure its broader territorial function. Beyond battlefield considerations, the barrier reorganizes the spatial structure of the conflict by consolidating Moroccan authority over the most economically and demographically significant parts of Western Sahara. As Dodds (2021) notes, the berm encloses the Atlantic-facing regions where key infrastructures, urban centers, and resource corridors are located, effectively transforming military defense into territorial consolidation. This spatial selectivity reveals how the barrier

operates as an instrument of geopolitical ordering: rather than simply separating two sides, it produces an asymmetrical territorial configuration that privileges one actor's capacity to govern, extract, and administer space. In this respect, the berm exemplifies what border studies describe as the territorialization function of barriers — the ability of material infrastructures to transform contested spaces into governable territories (Paasi, 1998; Elden, 2013). By stabilizing a line of control and embedding it within logistical, administrative, and infrastructural networks, the barrier contributes to the gradual normalization of Moroccan presence west of the wall. The result is not merely military containment but the production of a differentiated territorial regime in which sovereignty is unevenly distributed across space.

Alongside its military and territorial dimensions, the berm also performs a powerful symbolic function. Physical barriers in contested regions often operate as visible assertions of authority, projecting an image of permanence even in the absence of formal recognition (Brown, 2010; Dodds, 2021). In the Western Sahara case, the sheer scale and materiality of the berm contribute to constructing a landscape of *de facto* sovereignty, reinforcing Morocco's narrative of territorial integrity. The barrier thus functions as a geopolitical statement: by materializing control in physical form, it transforms a disputed claim into a spatial fact that shapes both local perceptions and international diplomacy. This symbolic dimension is closely tied to the concept of "facts on the ground," frequently invoked in geopolitical analyses of protracted territorial conflicts. Through its durability and infrastructural embedding, the berm contributes to freezing the conflict into a stable territorial arrangement that is difficult to reverse without major geopolitical disruption. As such, its function extends beyond defense into the realm of temporal politics, anchoring a provisional situation into long-term spatial permanence (Foucher, 1991; Dodds, 2021). These dimensions highlight the hybrid nature of the berm. It operates simultaneously as a military fortification, a territorial ordering device, and a symbolic instrument of sovereignty. This multifunctionality underscores a key insight of contemporary border scholarship: barriers do not simply divide space but actively produce geopolitical realities. In Western Sahara, the berm does not merely separate Moroccan and Polisario-controlled areas; it structures the very conditions under which sovereignty is exercised, contested, and perceived.

Territorial and Socio-Environmental Consequences

The Moroccan berm has generated profound territorial, social, and environmental consequences that extend far beyond its immediate military rationale. Rather than functioning as a passive line of separation, the structure has actively reshaped the spatial organization of Western Sahara, producing enduring forms of fragmentation and asymmetry across the region. At the territorial level, the berm has effectively partitioned Western Sahara into two radically unequal spaces. The western portion, under Moroccan control, concentrates most urban settlements, economic infrastructure, and access to natural resources, including phosphate deposits and Atlantic fisheries. By contrast, the eastern areas controlled by the Polisario Front remain sparsely populated and largely excluded from major economic circuits. This spatial division has produced what several scholars describe as a geography of uneven sovereignty, in which territorial control is materially consolidated on one side of the barrier while remaining politically contested on the other (Zunes & Mundy, 2010; Mundy, 2012). The barrier has also deeply transformed patterns of mobility and everyday life in Sahrawi borderlands. Families historically connected through nomadic routes and kinship networks have been physically separated, while refugee camps in Tindouf, Algeria, have become semi-permanent sites of displacement. The berm therefore operates not only as a military infrastructure but also as a long-term device of spatial immobilization, freezing a conflict that remains formally unresolved. In this sense, the barrier contributes to what has been described as a “protracted temporality of waiting,” in which mobility, return, and self-determination remain indefinitely suspended (Stephan & Mundy, 2006).



Figure 6. Aerial view of a section of the Moroccan berm in Western Sahara. The image illustrates the linearization of the desert landscape produced by the sand wall and associated defensive infrastructure. Source: MINURSO.

Environmental consequences are equally significant yet often underexplored. The berm is surrounded by extensive minefields and militarized buffer zones, making it one of the most heavily mined regions in the world. These conditions have fragmented fragile desert ecosystems, restricted pastoral routes, and limited humanitarian and environmental access to large portions of the territory. In arid environments such as Western Sahara, where mobility is essential for ecological balance, the imposition of fixed military infrastructures can generate long-term disruptions to human–environment relations (UNMAS, 2022). Beyond its immediate spatial effects, the berm has contributed to the normalization of a de facto territorial order that remains legally contested at the international level. By stabilizing a line of control without resolving the underlying sovereignty dispute, the barrier reinforces a condition in which territorial realities on the ground diverge from formal legal frameworks. Western Sahara thus exemplifies how contemporary border barriers can solidify geopolitical stalemates, transforming temporary military arrangements into enduring territorial

configurations (Boukhars, 2020; Dodds, 2021). In this perspective, the Moroccan berm does not merely separate spaces; it actively produces a reconfigured borderland characterized by spatial inequality, prolonged displacement, and ecological disruption. Its consequences illustrate how the materialization of borders can reshape entire regions, embedding political conflict into the landscape and extending its effects across generations.

The United States–Mexico Border Wall



Figure 7 – Route of the U.S.–Mexico border barrier. The map shows the fragmented distribution of physical barriers along the U.S.–Mexico border, combining constructed fencing with natural boundaries such as the Rio Grande. Source: BBC / OpenStreetMap.

The United States–Mexico border wall cannot be understood as a sudden political initiative but rather as the outcome of a long historical process of border militarization, technological experimentation, and shifting geopolitical narratives. The southern border itself emerged from the territorial reconfiguration that followed the Mexican–American War (1846–1848), which established the Rio Grande as a key natural boundary between the two states (Ganster & Lorey, 2008). As noted by Dodds (2021), the Rio Grande represents a classic example of a “border-making river,” where natural geography is mobilized to sustain political separation. While the boundary has existed since the nineteenth century, its material fortification is largely a late twentieth-century development. During the 1990s, U.S. authorities adopted a strategy of migration deterrence through spatial control, concentrating enforcement in urban corridors such as San Diego and El Paso. Operations like Gatekeeper and Hold-the-Line marked the beginning of systematic border hardening through fencing, surveillance technologies, and increased patrol presence (Andreas, 2000; Nevins, 2002). Rather than stopping

migration entirely, these policies redirected mobility toward remote desert areas, reshaping the geography of migration and increasing the risks associated with irregular crossings. A major turning point occurred after the attacks of 11 September 2001, which redefined migration governance within a broader homeland security framework. As highlighted by Dodds (2021), the post-9/11 environment intensified investment in both physical and technological barriers, including the development of “virtual fences” and sensor-based monitoring systems. Initiatives such as the Secure Border Initiative and Project 28 sought to create an integrated surveillance architecture combining drones, sensors, and data processing technologies. Although some of these programs were eventually abandoned due to cost and technical limitations, they contributed to embedding the border within a wider security-technological paradigm.

The physical consolidation of the barrier accelerated with the Secure Fence Act of 2006, which authorized the construction of hundreds of miles of reinforced fencing. Official discourse framed these measures primarily in terms of migration control, counterterrorism, and crime prevention (U.S. Congress, 2006). However, critical scholarship suggests that the wall must also be interpreted within a broader political context in which borders operate as performative instruments of sovereignty (Brown, 2010; Jones, 2016). In this sense, border fortification responds not only to functional pressures but also to the symbolic need to reaffirm territorial authority in an era of globalization. This symbolic dimension became particularly evident during the Trump administration, when the promise of a continuous border wall became a central element of political campaigning. As Dodds (2021) notes, the idea of the wall evolved alongside parallel imaginaries of “smart borders” and technological surveillance, revealing the coexistence of physical and digital bordering strategies. The wall thus functioned simultaneously as infrastructure and narrative: a material intervention designed to regulate mobility, but also a highly visible political symbol mobilized in debates over national identity, sovereignty, and demographic change. Scholars have emphasized the discrepancy between declared and underlying motivations behind the expansion of the barrier. While official rhetoric focuses on border security and migration management, alternative interpretations highlight domestic political incentives, including electoral mobilization, identity politics, and the performative staging of state power (De Genova, 2017; Brown, 2010). From this perspective, the

U.S.–Mexico wall exemplifies how contemporary barriers often operate as geopolitical artifacts that condense security logics, technological experimentation, and symbolic politics into a single spatial form.



Figure 8 – U.S.–Mexico border wall near El Paso, Texas (2024). Example of contemporary steel bollard fencing used in recent phases of U.S. border fortification. Source: Ariana Figueroa / States Newsroom.

Functional Dimension of the Barrier

The functional logic of the U.S.–Mexico border wall is inherently hybrid, combining securitarian, technological, and symbolic dimensions. Unlike barriers primarily designed for territorial defense or conflict containment, the U.S.–Mexico wall operates within a complex governance regime where physical infrastructure is embedded in broader systems of surveillance and mobility control (Vallet, 2014; Jones, 2016). At the most immediate level, the barrier serves a securitarian function aimed at regulating irregular migration and cross-border crime. Physical fencing, reinforced barriers, and patrol roads are intended to deter unauthorized crossings and channel mobility toward controlled entry points. As with earlier border fortification strategies, the objective is less to create an impermeable boundary than to reshape mobility patterns by increasing the costs and risks of irregular movement (Andreas, 2000; Nevins, 2002). In this sense, the wall functions as a spatial filtering device rather than an absolute barrier.

However, the functional logic of the U.S.–Mexico border extends well beyond its material components. As highlighted by Dodds (2021), the border increasingly operates as a layered infrastructure integrating physical barriers with digital surveillance systems, including drones, sensors, biometric monitoring, and data analytics. These technologies contribute to what has been described as the emergence of a “smart border,” where control is exercised through distributed and networked mechanisms rather than solely through linear fortifications. This hybridization blurs the distinction between wall and surveillance regime, transforming the border into a technologically mediated security assemblage.

A key feature of the barrier’s functionality lies in the divergence between intended and effective outcomes. While official discourse frames the wall as a tool for stopping migration and enhancing security, empirical studies suggest that its primary effect has been the redirection rather than the reduction of mobility (Nevins, 2002; Jones, 2016). Migrants increasingly rely on more remote and hazardous routes, particularly through desert regions, illustrating how barriers reshape spatial practices rather than eliminating them. In this regard, the wall functions as a mechanism of spatial displacement, producing new geographies of risk along the borderlands. Beyond its operational role, the U.S.–Mexico wall performs a powerful symbolic function. Scholars have emphasized that contemporary border walls often operate as performative infrastructures that materialize political narratives of sovereignty and exclusion (Brown, 2010; De Genova, 2017). The U.S.–Mexico case exemplifies this dynamic: the wall acts not only as a control device but also as a visible assertion of state authority, reinforcing imaginaries of territorial integrity and national identity. Its political salience is amplified by its visibility in public discourse, where the wall functions as a spatial metaphor for control in an era of perceived globalization and mobility crises. This symbolic dimension does not replace the wall’s securitarian function but rather coexists with it, generating a multi-layered functional profile. As Vallet (2014) notes, contemporary barriers often operate simultaneously across multiple registers, combining practical control mechanisms with political messaging. In the U.S.–Mexico case, the wall thus emerges as a paradigmatic example of a hybrid border infrastructure: a material barrier embedded in a wider regime of surveillance, governance, and symbolic politics.

particularly the Sonoran and Chihuahuan deserts. This process has transformed the border into what scholars describe as a “landscape of deterrence,” where natural terrain becomes an indirect enforcement mechanism (De León, 2015). The redirection of mobility has had profound humanitarian implications. By forcing migrants into harsher environments, border hardening has contributed to a significant rise in migrant deaths, particularly due to dehydration, heat exposure, and disorientation in desert regions (De León, 2015; Jones, 2016). As noted by Jones (2016), U.S. border enforcement strategies explicitly aimed to redirect migrants toward terrains “more suited for enforcement,” effectively transforming the environment itself into a tool of deterrence. In this sense, the wall produces indirect forms of violence by externalizing risk onto the environment, illustrating how material barriers can reshape not only spatial patterns but also survival conditions within borderlands.

At the territorial scale, the hybrid configuration of the U.S.–Mexico border — combining physical barriers, surveillance infrastructures, and natural boundaries such as the Rio Grande — has generated fragmented and uneven spatial effects (Dodds, 2021). In several areas, the wall runs inland rather than along the riverbank, creating buffer zones and so-called “no man’s lands” between the barrier and the actual international boundary. These spaces often disrupt property rights, restrict access to land, and complicate jurisdictional governance for local communities. At the socio-political level, the wall has reconfigured everyday life in border regions, intensifying tensions between federal authorities and local communities. Land expropriations, restricted mobility, and increased surveillance have generated legal disputes and political contestation, particularly in Texas and Arizona (Jones, 2016).

In some cases, indigenous territories and cross-border communities have been divided by new infrastructure, disrupting longstanding patterns of mobility and social interaction across the borderlands. Environmental impacts represent another critical dimension of the wall’s consequences. Physical barriers disrupt wildlife corridors across fragile ecosystems, particularly in desert and riparian environments along the southern border (Flesch et al., 2010). Species such as jaguars, ocelots, and pronghorn antelopes face increased habitat fragmentation due to fencing and associated infrastructure. In riparian zones, construction activities and surveillance installations can alter water flows and damage sensitive ecosystems linked to the Rio Grande basin.

These dynamics highlight how the U.S.–Mexico wall functions as a transformative territorial intervention rather than a simple security device. By redirecting migration routes, reshaping borderland geographies, and generating environmental disruption, the barrier exemplifies how contemporary bordering practices produce layered and long-term consequences that extend far beyond their declared security objectives.

The India–Bangladesh Border Fence



Figure 10. The India–Bangladesh land boundary. The map highlights the irregular morphology of the India–Bangladesh border, a product of colonial partition and postcolonial territorial settlements. Source: The Indian Express.

The India–Bangladesh border barrier emerged from a layered historical trajectory shaped by colonial partition, postcolonial state formation, and the progressive securitization of cross-border mobility. The boundary originates from the 1947 Partition of British India, when the Radcliffe Line divided Bengal between India and East Pakistan (later Bangladesh), fragmenting deeply interconnected social and economic landscapes (van Schendel, 2005). The creation of Bangladesh in 1971 further intensified regional displacement and migration flows, consolidating the frontier as a central site of postcolonial territorial reconfiguration (Chatterji, 2013). For decades, the border remained relatively permeable, sustained by kinship networks, informal trade, and seasonal migration. However, from the late twentieth century onward, it became increasingly politicized, particularly in India’s northeastern states. The Assam Movement (1979–1985) marked a critical turning point, as mass mobilizations framed migration from Bangladesh as a demographic and cultural threat, transforming localized anxieties into a national political issue (Baruah, 1999; Samaddar, 1999).

From the 1990s onward, migration from Bangladesh was progressively reframed within Indian national discourse as a security concern. Political actors increasingly associated undocumented migration with national vulnerability, economic pressure, and cultural destabilization. As Malini Sur (2014) argues, this shift must be understood within a broader global context marked by the proliferation of security barriers and the growing securitization of migration. In the South Asian context, migration statistics have frequently been mobilized in political discourse to reinforce narratives of porous borders and demographic infiltration, despite their contested empirical basis (Sur, 2014). However, as Klaus Dodds emphasizes, contemporary borders cannot be understood solely as terrestrial lines. They are embedded in wider geopolitical and environmental systems that extend beyond the land frontier (Dodds, 2017). In the Indo–Bangladesh case, this broader spatial frame includes the Bay of Bengal, a densely populated and environmentally fragile region where geopolitical tensions intersect with climate vulnerability.

The consolidation of the border fence therefore reflects more than a response to migration pressures. It is embedded in a broader transformation of border governance characterized by militarization and the normalization of exceptional security practices. Anthropological research highlights how the materialization of the fence has been accompanied by intensified border policing and recurrent episodes of cross-border violence, reinforcing the perception of the frontier as a zone of insecurity rather than coexistence (Sur, 2014; Jones, 2009).

At the domestic level, the securitization of migration has functioned as a powerful instrument of political mobilization. Narratives portraying Bangladeshi migrants as demographic threats have played a central role in electoral discourse, particularly in regions marked by ethnic and religious polarization. In this sense, the barrier contributes to processes of domestic legitimation by reinforcing the state's role as guarantor of national identity and territorial integrity (Samaddar, 1999). At the geopolitical level, the fence also operates as an instrument of territorial consolidation. Historically characterized by overlapping sovereignties and informal mobility practices, the India–Bangladesh frontier has been progressively transformed into a rigid geopolitical boundary through physical fortification. This process reflects a

broader global pattern in which states respond to perceived mobility crises through the material re-territorialization of borders (Brown, 2010; Vallet, 2014). The India–Bangladesh barrier illustrates the gap between declared and underlying motivations typical of contemporary border fortifications. While officially framed as a response to irregular migration and cross-border insecurity, the fence reflects deeper political dynamics, including identity politics, domestic legitimation, and the consolidation of territorial sovereignty. As such, the barrier embodies a broader political project that extends beyond its immediate security rationale, aligning with wider trends in the resurgence of material bordering practices in the twenty-first century.

Functional Dimension of the Barrier



Figure 11. Fortified section of the India–Bangladesh border. Barbed-wire fencing and surveillance infrastructure along the India–Bangladesh frontier, illustrating the materialization of securitized bordering practices aimed at controlling irregular mobility and cross-border activities. Source: Northeast Live.

From a functional perspective, the India–Bangladesh barrier represents a predominantly securitarian infrastructure, although its operational logic is hybrid. Extending for more than 4,000 kilometers, the system consists primarily of barbed-wire fencing, floodlighting networks, patrol roads, and surveillance installations, making it one of the longest fortified borders in the contemporary world (Vallet, 2014). The primary declared function of the fence is the regulation of cross-border mobility. Indian authorities have consistently framed the infrastructure as a response to irregular

crossings, trafficking, smuggling, and infiltration by non-state actors. Within this narrative, the barrier is presented as a mechanism for restoring territorial control and reasserting state authority over unauthorized movement. In this sense, it aligns with broader global tendencies in which physical barriers are increasingly deployed as instruments of migration management (Brown, 2010; Vallet, 2014).

Beyond its official rationale, however, the barrier performs additional operative functions. One of its most significant effects concerns the spatial reorganization of a historically interconnected borderland. Rather than simply preventing movement, the fence contributes to transforming a historically relational frontier into a rigid territorial interface, restructuring the ways in which sovereignty is experienced and enforced on the ground (van Schendel, 2005). The infrastructure also performs a strong militarizing function. The expansion of fencing has been accompanied by the consolidation of permanent surveillance regimes and an enhanced security presence, particularly through the activities of the Border Security Force (BSF). This evolution has contributed to the transformation of the frontier into a zone governed by intensified monitoring and exceptional enforcement practices (Jones, 2009; Sur, 2014). In addition to its securitarian and territorial roles, the barrier carries a significant symbolic dimension. As Brown (2010) argues in her analysis of contemporary walls, border fortifications often operate as performative structures that communicate sovereignty and political resolve. In the Indian context, the fence materializes narratives of vulnerability and demographic pressure, transforming diffuse anxieties into a visible geopolitical infrastructure. Importantly, the intended and effective functions of the barrier do not fully coincide. While the fence has reduced certain forms of visible mobility, it has not eliminated cross-border movement. Instead, it has contributed to the reconfiguration of mobility patterns, displacing crossings toward more clandestine and risk-laden routes often mediated by informal networks (Samaddar, 1999; Sur, 2014). This dynamic illustrates how border barriers frequently function less as absolute deterrents than as mechanisms of mobility filtering and spatial redistribution.

The India–Bangladesh barrier operates as a hybrid infrastructure combining securitarian, territorial, and symbolic functions. While officially framed as a mobility-control device, the fence also consolidates state presence in peripheral regions, materializes sovereignty, and reshapes patterns of movement across the borderland.

Territorial and Socio-Environmental Consequences

The consequences of the India–Bangladesh border barrier extend far beyond its declared security rationale, reshaping territorial dynamics, social relations, and environmental systems across the borderland. One of the most immediate effects concerns the reconfiguration of mobility patterns. While the fence has reduced visible crossings, it has displaced mobility toward more clandestine and hazardous routes mediated by informal brokers and smuggling networks (Samaddar, 1999; Sur, 2014). This redistribution of movement illustrates a broader pattern observed in fortified borders globally, where barriers reshape rather than eliminate mobility. Socially, the fence has fragmented historically interconnected communities. Villages have been physically divided, disrupting kinship ties, agricultural practices, and local markets that long predated the hardening of the border (van Schendel, 2005). The expansion of fencing has also intensified the militarization of everyday life, producing borderlands characterized by surveillance, coercion, and recurrent violence (Human Rights Watch, 2010).

Economically, the barrier has transformed rather than eliminated informal cross-border exchanges. Smuggling networks remain embedded in border economies, adapting to the presence of fencing through alternative routes and localized practices, underscoring the limits of material fortification (Lewis, 2013). From an environmental perspective, however, the Indo–Bangladesh case reveals dynamics that extend beyond conventional border studies. As Dodds highlights, the broader Bay of Bengal region is one of the most climate-vulnerable geopolitical spaces in the world (Dodds, 2017). Rising sea levels, intensified cyclones, and deltaic instability are reshaping coastlines and generating new forms of territorial uncertainty. The disappearance of contested landforms such as New Moore Island (South Talpatti), which submerged in 2010 due to rising sea levels, illustrates how environmental transformations can destabilize territorial claims and maritime boundaries (Dodds, 2017). Such dynamics underscore the tension between rigid border infrastructures and fluid environmental realities.

Climate change introduces a forward-looking dimension to the analysis of border dynamics. Bangladesh is widely identified as one of the regions most exposed to climate-induced displacement, where low-lying deltaic geography and high population density generate significant environmental vulnerability (IPCC, 2022). As sea-level

rise accelerates and extreme weather events intensify across the Bay of Bengal, hazards such as coastal flooding, riverbank erosion, and soil salinization are increasingly reshaping settlement patterns and demographic dynamics (World Bank, 2018). Despite contributing less than 0.5 percent of global greenhouse gas emissions, Bangladesh consistently ranks among the most vulnerable countries in the Global Climate Risk Index. According to the World Bank's Groundswell report (2018), rising sea levels could submerge up to 17 percent of Bangladesh's territory by 2050, potentially displacing between 20 and 30 million people. Recent extreme events, including Cyclone Remal and the 2024 floods affecting more than 18 million residents, illustrate the increasing frequency and severity of climate-related disasters (IFRC, 2024).

These developments are accelerating the transition from seasonal rural-to-urban mobility toward more permanent forms of displacement (IOM, 2023). In response, the Government of Bangladesh has incorporated climate adaptation into long-term development strategies through policy frameworks such as the Bangladesh Delta Plan 2100 and the National Adaptation Plan (2023–2050). These initiatives focus on coastal protection, climate-resilient infrastructure, and improved water management systems. Nevertheless, adaptation measures are unlikely to fully prevent large-scale internal migration. World Bank projections estimate that more than 13.3 million people may be forced to relocate internally by mid-century (World Bank, 2018). The implications of these dynamics extend beyond domestic governance. Along the Indo–Bangladesh frontier, concerns about migration have long been framed within security narratives in India.

Within this context, climate-induced mobility is increasingly interpreted through the lens of demographic pressure and irregular movement (McAdam, 2012).

As environmental transformations reshape livelihoods and settlement patterns, climate-related displacement is gradually becoming intertwined with border governance, reinforcing political arguments for the strengthening of border infrastructures and the securitization of territorial boundaries.

This anticipated mobility reinforces securitization narratives and may further intensify border fortification efforts, creating a feedback loop between environmental vulnerability and hardening borders. In this sense, the India–Bangladesh barrier

exemplifies a broader paradox identified by Dodds: while states invest in increasingly rigid bordering technologies, the environmental foundations of territorial sovereignty are becoming progressively unstable. The materialization of the border thus produces not only spatial and social fragmentation but also reveals the limits of fixed territorial infrastructures in an era of environmental transformation.

The Former East–West German Border



Figure 12 — The former Inner German border (1949–1990). The map shows the boundary that divided East and West Germany during the Cold War. Although dismantled after reunification, the legacy of this border continues to shape spatial and socio-political patterns in contemporary Germany. Source: Bundeszentrale für politische Bildung; Stiftung Berliner Mauer.

The East–West German division emerged from the geopolitical reordering of Europe after World War II, when Germany was partitioned into occupation zones controlled by the Allied powers. In 1949, this temporary arrangement crystallized into two

separate states: the Federal Republic of Germany (FRG) in the West and the German Democratic Republic (GDR) in the Soviet sphere of influence.

The resulting division placed Germany at the epicentre of the Cold War, transforming the inter-German border into one of the most visible fault lines of the bipolar international system (Gaddis, 2005; Fulbrook, 2005). From its inception, the German divide was not only territorial but systemic. The FRG developed into a liberal-democratic, market-oriented state integrated into the Western bloc, while the GDR adopted a socialist model aligned with the Soviet Union. These divergent trajectories produced deep asymmetries in economic performance and living standards, generating strong migration pressures from East to West.

Between 1949 and 1961, millions of East Germans left the GDR, producing a demographic and economic crisis for the socialist regime and undermining its political legitimacy (Harrison, 2003; IDRN, 2025). This mass emigration — often described as a “brain drain” — represented one of the primary drivers behind the construction of the Berlin Wall. Many emigrants were young, skilled, and economically active, depriving the GDR of critical human capital and exposing the structural weaknesses of the socialist system (Economics Observatory, 2023).

The inability to stem this outflow through administrative measures led East German authorities to progressively militarize the border, culminating in the construction of the Berlin Wall in August 1961. Officially, the GDR framed the barrier as an “anti-fascist protective rampart,” portraying it as a defensive measure against Western subversion and espionage.

However, historical research consistently highlights a gap between declared and underlying motivations. While security rhetoric dominated official discourse, the primary objective was to halt emigration and stabilize the regime internally (Harrison, 2003; Major, 2010). The wall thus functioned as a mechanism of domestic regime preservation rather than a purely defensive border infrastructure.

Beyond migration control, the barrier also carried broader geopolitical and symbolic functions. It materialized the ideological divide of the Cold War, embodying the confrontation between competing political systems and serving as a global symbol of the Iron Curtain.



Figure 13. Section of the Berlin Wall dividing East and West Berlin during the Cold War. Source: OregonLive (2018).

As recent scholarship notes, the German border became both a physical and symbolic frontier, deeply embedded in identity formation and geopolitical narratives (IDRN, 2025). In this sense, the construction of the Berlin Wall should be understood as part of a wider strategy of territorial consolidation, regime legitimation, and ideological

positioning. The barrier was not merely a response to migration pressures but a material manifestation of Cold War geopolitics, designed to stabilize a fragile socialist state while simultaneously signaling the permanence of the East–West divide.

Functional Dimension of the Barrier

The East–West German divide represents a distinctive case within the comparative framework, as it illustrates how border functions may persist beyond the dismantling of physical infrastructures. While the Berlin Wall initially operated as a hard territorial barrier, its functional logic progressively evolved from material enforcement to symbolic persistence after 1989. During the Cold War, the dominant function of the barrier was primarily securitarian and regime-oriented. Unlike conventional defensive borders, however, the Wall was oriented inward: its main purpose was not to repel external threats but to regulate population mobility and preserve the political stability of the GDR. In this sense, it functioned as an instrument of internal territorial governance designed to immobilize citizens and sustain the socialist state (Harrison, 2003; Major, 2010).

At the same time, the Wall carried a powerful symbolic dimension even during its material existence. As one of the most visible manifestations of the Iron Curtain, it condensed the ideological geography of the Cold War into a globally recognizable geopolitical marker (Dodds, 2021). This reflects a broader insight within critical border studies: borders operate not only as territorial infrastructures but also as discursive and representational devices shaping geopolitical imaginaries (Brown, 2010; Jones, 2016). The fall of the Berlin Wall in 1989 was widely interpreted as signalling the decline of ideological divisions and the emergence of a more borderless world. As Dodds notes, the dismantling of communist barriers fed post-Cold War optimism about the “end of history” and the presumed obsolescence of hard borders in an increasingly globalized order (Dodds, 2021). However, subsequent developments complicate this interpretation. Rather than disappearing, the German border underwent a process of functional transformation.

Within the analytical framework adopted in this thesis, the former East–West divide can be understood as a case of functional mutation: a border that shifted from a primarily securitarian infrastructure to a predominantly symbolic and socio-spatial

structure after its physical removal. This trajectory aligns with scholarship highlighting the persistence of bordering processes beyond material barriers, including the emergence of “phantom borders” that continue to shape spatial identities and political behaviour long after reunification (Vallet, 2014; IDRN, 2025).

Territorial and Socio-Spatial Consequences

The dismantling of the Berlin Wall did not eliminate the spatial effects of the East–West divide. Instead, the German case demonstrates how borders may continue to shape territories and societies long after their material removal. The legacy of the former inter-German border is visible not only in memory practices but also in socio-economic structures, political behaviour, and cultural identities. One of the most evident consequences concerns the persistence of regional disparities between eastern and western Germany. Despite formal reunification in 1990, significant differences remain in income levels, productivity, demographic trends, and labour market structures. Eastern regions continue to experience lower average wages, higher outmigration, and weaker industrial bases compared to their western counterparts (Economics Observatory, 2023). These enduring inequalities suggest that borders may imprint long-term spatial trajectories, structuring development patterns that persist across generations.

Political geography provides further evidence of the border’s lingering influence. Electoral maps repeatedly reveal distinct voting patterns aligned with the former division, with eastern regions showing stronger support for populist and protest-oriented parties. Scholars interpret these patterns as manifestations of historical path dependency, whereby past political and institutional structures continue to shape contemporary political cultures (IDRN, 2025). In this sense, the former border operates as a “phantom boundary,” structuring political behaviour despite its physical disappearance. Beyond measurable indicators, the persistence of the East–West divide is also reflected in social perceptions and identity formations. Expressions such as “East” and “West” continue to function as meaningful categories within public discourse, influencing debates on representation, inequality, and national cohesion. Survey-based research indicates that many citizens still perceive differences in mentality, opportunity structures, and life experiences rooted in the former division,

highlighting the durability of symbolic borders in everyday social imaginaries (Pew Research Center, 2019). Memory practices further reinforce this symbolic persistence. Numerous memorial sites, museums, and preserved segments of the Berlin Wall maintain the visibility of the former border within the cultural landscape. These lieux de mémoire function not only as commemorative spaces but also as pedagogical tools that sustain awareness of division and reunification. As Light and Young (2010) argue, the memorialization of former borders contributes to the ongoing reproduction of spatial memory, ensuring that past territorial divisions remain embedded within collective consciousness. At the same time, the transformation of parts of the former border into ecological and commemorative landscapes illustrates processes of spatial re-signification. Large stretches of the old border zone have been converted into the “European Green Belt,” an ecological corridor that emerged from decades of restricted human activity along the Iron Curtain. What was once a militarized frontier has thus been reinterpreted as a transboundary environmental asset, demonstrating how borders may acquire new meanings through political and social change (European Green Belt Initiative, 2020).

Cultural dynamics further complicate the legacy of the border. Phenomena such as *Ostalgie*—a form of nostalgia for aspects of life in the former GDR—highlight the affective dimensions of bordering. This cultural memory reflects ambivalent attitudes toward reunification and underscores how borders may persist through emotional and mnemonic registers, reinforcing symbolic distinctions within a formally unified national space (Boyer, 2006). These dynamics suggest that the German case cannot be understood solely through the lens of border disappearance. Instead, it reveals a process of transformation in which a material barrier evolves into a multi-layered socio-spatial structure. The former East–West divide continues to operate through economic inequalities, political geographies, cultural narratives, and memory landscapes, demonstrating that borders may endure as relational and symbolic constructs even after their physical dismantlement. From a theoretical perspective, this trajectory supports approaches that conceptualize borders as dynamic processes rather than fixed lines. Scholars such as Paasi (1998) and Newman (2006) argue that borders are continuously reproduced through social practices, discourses, and institutional arrangements.

The German case provides a compelling empirical illustration of this perspective, showing how bordering processes can survive the removal of physical infrastructures and continue to shape spatial imaginaries over time. Another dimension of the Wall's legacy concerns its transformation into a visual and artistic surface. Even before its fall, the western side of the Berlin Wall had become a space of political expression, covered with graffiti, slogans, and murals reflecting demands for freedom and reunification. These visual interventions reconfigured the barrier as a contested symbolic medium rather than a purely repressive structure.



Figure 14 — East Side Gallery, preserved section of the Berlin Wall. Source: BerlinPoche.de

After 1989, this process intensified through projects such as the East Side Gallery, where preserved segments of the Wall were repurposed as open-air art installations. The murals frequently depict themes of peace, liberation, and the end of ideological division, reflecting a broader cultural reinterpretation of the former barrier.

In this sense, the Wall evolved from an instrument of separation into a canvas of

collective memory and symbolic reappropriation. These visual representations highlight how borders may persist not only through institutions and narratives but also through images. Artistic reinterpretations contribute to the ongoing reproduction of the border in cultural memory, reinforcing its symbolic presence even in the absence of a functioning territorial barrier. In contrast to cases where walls are expanding or intensifying, the German example reveals what happens after a barrier falls. Rather than vanishing, the border migrates into new domains—economic, political, cultural, and mnemonic. This transformation is central to the broader argument of this thesis: border barriers are not merely instruments of control but generators of enduring spatial meanings. Even when dismantled, they leave traces that continue to structure territories and identities long into the post-barrier era.

Italy–Switzerland Border: The Binntal–Veglia–Devero Transboundary Area

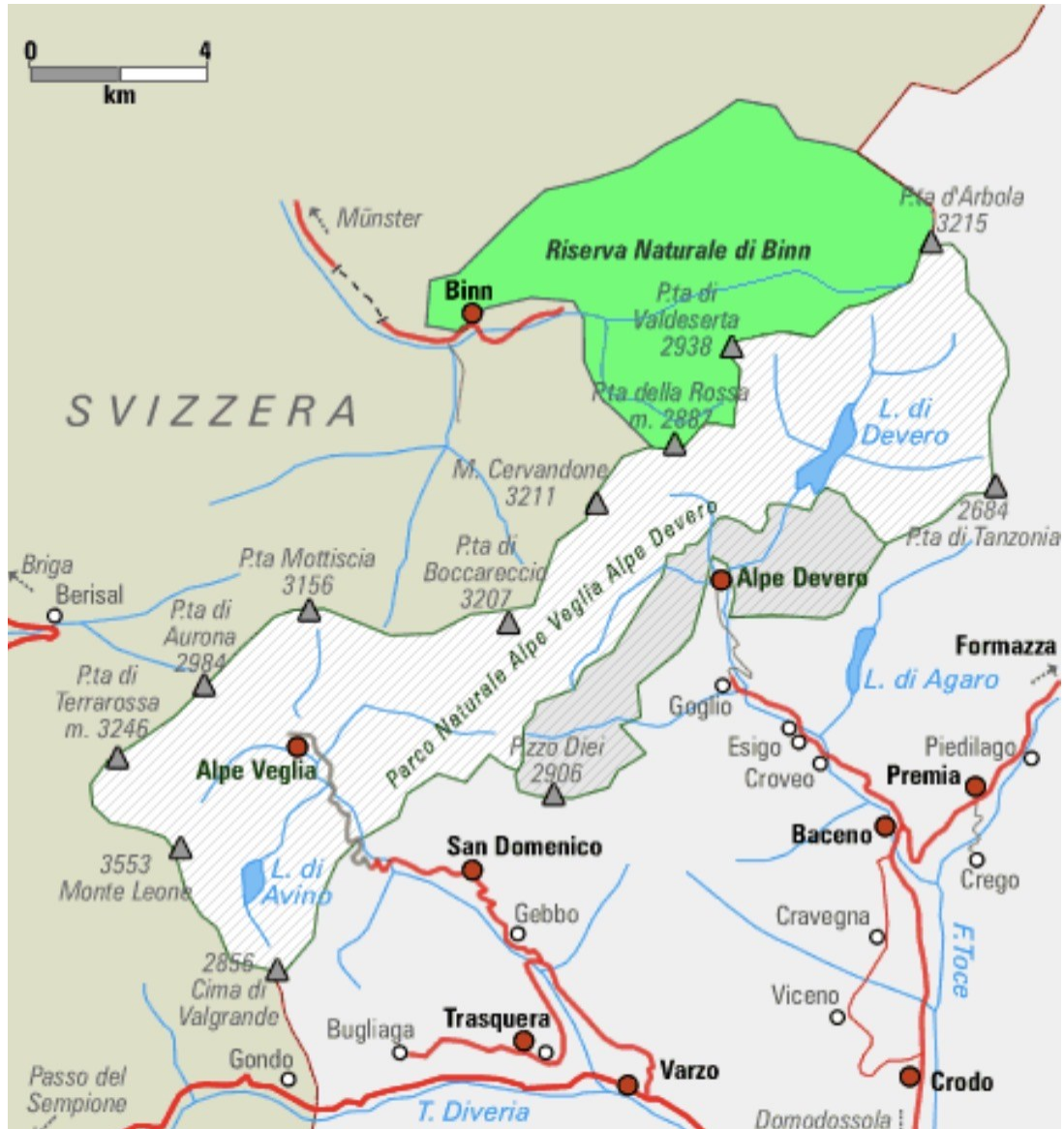


Figure 15 – Binntal–Veglia–Devero transboundary park system. The image illustrates the Alpine cross-border region linking the Binntal Landscape Park (Switzerland) with the Veglia and Devero Natural Parks (Italy), exemplifying a model of cross-border environmental governance where the international boundary functions as a shared ecological corridor. Source: Aree Protette dell'Ossola

Unlike the fortified borders analysed earlier in this thesis, the Binntal–Veglia–Devero region did not emerge from a moment of crisis, conflict, or securitization. Instead, its historical trajectory reflects a long-standing Alpine pattern in which political boundaries developed within spaces already characterized by mobility, ecological

continuity, and local interdependence (Viazzo, 2001; Debarbieux, 2012).

The international boundary between Switzerland and Italy in this sector of the Alps was formalized during the broader nineteenth-century consolidation of European territorial states, when borders were increasingly stabilized through cartographic delimitation and bilateral agreements (Foucher, 2007; Anderson, 1996). However, in contrast to lowland frontiers shaped by military rivalries, the Alpine environment imposed structural limits on both infrastructural penetration and geopolitical centrality. Rugged terrain, sparse settlement patterns, and harsh climatic conditions reduced incentives for large-scale militarization, allowing the border to remain materially “thin” (Debarbieux & Rudaz, 2010). Historically, the Binntal and Ossola valleys were connected through seasonal mobility systems typical of Alpine societies, including transhumance, pastoral exchanges, and cross-valley trade routes (Viazzo, 2001). These practices predated modern state boundaries and contributed to the persistence of cross-border socio-economic ties even after the formalization of the international frontier. In this sense, the border was superimposed onto an already relational landscape, rather than producing a sharp rupture in spatial practices (Raffestin, 1980).

During the twentieth century, while many European borders underwent phases of securitization linked to world wars and Cold War geopolitics, this Alpine sector remained peripheral to major strategic confrontations. Although Switzerland developed a broader defensive doctrine centered on territorial neutrality and Alpine fortifications, this specific frontier never became heavily militarized (Church & Reid, 1996; Leimgruber, 2005). Its limited geopolitical salience prevented the emergence of permanent barriers comparable to those observed in other European borderlands. The most significant transformation occurred in the late twentieth and early twenty-first centuries, driven not by security concerns but by shifting political and normative frameworks. Processes of European integration, the diffusion of cross-border regionalism, and the rise of environmental governance reshaped the meaning of many internal European borders (Scott, 2012; Perkmann, 2003).

Alpine regions in particular became key laboratories for transboundary cooperation, as ecological systems transcend national boundaries and require coordinated management (Balsiger, 2016). The creation of protected areas on both sides of the

border — including the Binntal Landscape Park in Switzerland and the Veglia and Devero Natural Parks in Italy — marked a turning point in this transformation. Rather than reinforcing the boundary as a line of exclusion, these initiatives reframed it as a shared environmental asset, promoting conservation, sustainable tourism, and cross-border institutional collaboration (Giaccaglia, 2024; Aree Protette Ossola).

From a political perspective, the motivations underlying this transformation differ significantly from those driving fortified borders. Instead of responding to perceived threats such as migration or armed conflict, the reconfiguration of the Binntal–Veglia–Devero border was shaped by a convergence of ecological rationalities, regional development agendas, and evolving European border imaginaries (Paasi, 2011; Scott, 2012). This trajectory illustrates how bordering processes can evolve independently of securitarian logics. In line with relational approaches to borders (Raffestin, 1980; Paasi, 2011), the Binntal–Veglia–Devero case shows that borders are historically contingent institutions shaped by environmental conditions, political priorities, and regional imaginaries. Rather than emerging from crisis, this border exemplifies a gradual transformation rooted in continuity, adaptation, and the redefinition of territorial meaning.

Functional Dimension of the Barrier

From a functional perspective, the absence of walls does not imply the absence of bordering. Instead, the border retains a juridical and administrative function while being materially “soft” in its spatial manifestation (Paasi, 2011). It continues to delineate sovereignty and legal authority, but its everyday operation is mediated through permeability, interaction, and institutional coordination. The dominant functional logic in this case can be described as ecological-relational. Environmental governance frameworks have progressively transformed the border into a shared ecological interface, where conservation practices extend across national boundaries (Balsiger, 2016). Protected areas on both sides operate within a broader transboundary environmental continuum, requiring coordination in biodiversity monitoring, landscape management, and sustainable tourism policies.

In addition to its ecological role, the border performs a symbolic function as a marker of European cross-border cooperation.

Rather than embodying division, it serves as a visible example of how borders can be re-signified through institutional collaboration and shared governance (Scott, 2012). Hiking routes, cross-border trails, and joint cultural initiatives materialize this symbolic shift, translating abstract integration processes into everyday spatial practices. Importantly, the intended and effective functions largely converge in this case. While many fortified borders display gaps between official narratives and actual outcomes, the Binntal–Veglia–Devero border demonstrates a high degree of functional alignment. The declared goals of environmental cooperation and regional integration are largely reflected in spatial practices on the ground, reinforcing the perception of the border as a connective infrastructure.

From a theoretical standpoint, this case illustrates the performative nature of borders emphasized in relational border studies (Raffestin, 1980; Paasi, 2011). The border does not derive its meaning from material fortification but from the network of practices, institutions, and imaginaries that continuously reproduce it. In this sense, the Binntal–Veglia–Devero boundary exemplifies a form of bordering without barriers, where function is defined less by control than by coordination.

Territorial and Socio-Environmental Consequences

The cooperative configuration of the Binntal–Veglia–Devero border produces territorial consequences that differ significantly from those observed in fortified borderlands. Rather than generating fragmentation or exclusion, the border contributes to forms of spatial continuity and shared territorial governance.



Figure 16 – Alpine landscape of the Binntal transboundary region. The image illustrates the high-mountain environment of the Binntal Nature Park, part of the cross-border ecological system linking Switzerland and Italy. Source: Landschaftspark Binntal

At the ecological level, the absence of physical barriers allows ecosystems to maintain transboundary connectivity. Alpine habitats, wildlife corridors, and hydrological systems extend across the international boundary without major artificial interruptions, supporting biodiversity conservation and ecological resilience (Debarbieux & Rudaz, 2010).

This continuity reinforces the effectiveness of conservation strategies, particularly in high-mountain environments where ecological processes operate across large spatial scales. From a territorial perspective, the border fosters a model of cross-border regionalization. Instead of reinforcing peripheral isolation, transboundary cooperation initiatives contribute to redefining the area as a shared Alpine region. Joint tourism infrastructures, integrated hiking networks, and coordinated landscape branding promote a territorial identity that transcends national divisions (Perkmann, 2003; Scott, 2012).

From an economic perspective, this cooperative configuration supports the emergence of a localized cross-border Alpine economy shaped by sustainability-oriented activities. Sustainable tourism represents the most visible dimension, as interconnected hiking networks and eco-tourism infrastructures enhance the attractiveness of the region as a unified destination rather than two separate national spaces. This transboundary framing strengthens local economies based on hospitality, outdoor recreation, and small-scale services (Balsiger, 2016). At the same time, conservation policies limit large-scale industrial expansion, reinforcing a development model centered on low-intensity economic activities and environmental resilience (Debarbieux & Rudaz, 2010). Overall, the economic profile of the region reflects a form of selective integration, where cross-border cooperation generates benefits closely tied to sustainability and territorial branding rather than infrastructural dominance.

Socially, the border sustains patterns of interaction rather than division. Cross-border mobility for tourism, cultural exchange, and local collaboration reinforces everyday forms of connectivity, contributing to what some scholars describe as “borderland integration” (Paasi, 2011). In this sense, the border functions less as a line of separation than as a framework within which relational practices unfold. Importantly, the consequences of this bordering model are not entirely neutral. While cooperative borders generate positive outcomes in terms of ecological continuity and institutional dialogue, they may also produce selective inclusions.

Cross-border regions often remain accessible primarily to specific actors — tourists, local communities, and institutional stakeholders — while broader geopolitical inequalities persist at other scales (Scott, 2012). This highlights the scalar nature of bordering processes, where cooperation at the local level coexists with broader asymmetries. From a socio-environmental standpoint, the Binntal–Veglia–Devero case demonstrates how borders can support sustainability-oriented territorial transformations. Conservation policies, landscape protection, and soft mobility infrastructures contribute to shaping a borderland characterized by low anthropogenic pressure and high environmental value. In contrast to fortified borders that disrupt ecosystems and reconfigure spatial hierarchies through exclusion, this border illustrates a trajectory of territorial stabilization through cooperation.

A further interpretative lens for understanding the Binntal–Veglia–Devero transboundary park can be drawn from the ecological cartographies proposed by Peter Fend. Rather than organizing space according to political borders, Fend advocates for a spatial logic grounded in hydrographic basins and ecological continuities. From this perspective, territories should be understood as interconnected environmental systems rather than fragmented sovereign units. Applied to the Alpine context, this approach highlights how the Italian–Swiss border cuts across a historically integrated ecological landscape shaped by shared watersheds and mountain ecosystems.

The Binntal and Alpe Veglia areas belong to broader hydrological networks that transcend national divisions, reinforcing the idea that biodiversity protection and environmental governance cannot be effectively confined within state boundaries.

In this sense, the transboundary park can be interpreted as a practical approximation of the alternative spatial imaginaries envisioned by Fend. By privileging ecological interdependence over territorial separation, the park embodies a post-Westphalian logic in which borders are reconfigured from lines of division into spaces of ecological continuity and cooperation. The consequences of this bordering model challenge deterministic interpretations of borders as inherently divisive. The Binntal–Veglia–Devero region shows that borders can generate spatial outcomes based on continuity, interdependence, and shared stewardship, reinforcing the argument that contemporary bordering practices are highly contingent and context-dependent.

4. Comparative Analysis

The comparative analysis of the selected case studies makes it possible to identify recurring functional patterns that structure contemporary border barriers. Rather than revisiting each case individually, a thematic grouping reveals how geographically distant borders converge around shared logics, highlighting the persistence of material bordering in the contemporary geopolitical landscape. A first functional cluster includes barriers primarily driven by securitarian narratives. The cases of the India–Bangladesh fence and the US–Mexico wall exemplify this function. In both contexts, the materialization of the border is justified through discourses of protection against irregular mobility, demographic pressure, and territorial insecurity. Despite their distinct regional settings, these barriers share a common rationale: transforming the border into a spatial filter designed to regulate cross-border movement. From a comparative perspective, this convergence suggests that contemporary wall-building reflects broader global patterns of migration securitization rather than purely localized dynamics.

A second cluster is defined by barriers primarily aimed at consolidating territorial control. The Moroccan berm in Western Sahara represents the clearest example of this logic. Unlike migration-oriented barriers, the berm functions as a long-term geopolitical infrastructure that stabilizes a disputed territorial order. Its primary purpose lies in spatial control rather than mobility management, reinforcing sovereignty through the material consolidation of territorial claims. In this sense, the barrier illustrates how borders operate not merely as lines of separation but as active instruments in the production of territorial order. A third functional grouping emerges where border infrastructures produce layered consequences that extend beyond their declared objectives. The Białowieża border wall exemplifies this hybridity. While officially framed through security narratives, the barrier intersects with a transboundary ecological system, generating environmental fragmentation alongside geopolitical effects. This case highlights how contemporary borders frequently operate as multidimensional interventions that reshape both political and ecological landscapes. As border scholars have long argued, borders are not static lines but evolving processes that generate complex spatial effects (Paasi, 1998).

A further configuration is represented by borders that undergo processes of re-signification rather than reinforcement. The Binntal–Veglia–Devero transboundary park illustrates an alternative bordering logic in which the frontier becomes a space of ecological cooperation and shared governance. Positioned alongside fortified barriers, this Alpine case demonstrates that borders are not inherently exclusionary but can be politically reframed as sites of connectivity and collaboration. Such examples complicate deterministic narratives of global border hardening by revealing the coexistence of divergent bordering trajectories. Within this taxonomy, the Berlin Wall occupies a distinctive analytical position as a historical reference point that illuminates the evolution of contemporary barriers. During the Cold War, the Berlin Wall embodied an extreme form of material division rooted in ideological confrontation. Yet its enduring significance lies in its symbolic afterlife. Even after its dismantling, the image of the wall continues to shape political imaginaries of division and exclusion, demonstrating how material borders can generate long-lasting symbolic geographies. As Brown (2010) argues, walls often function not only as instruments of control but are also capable of producing meanings that extend far beyond their physical presence. These functional groupings reveal that contemporary border barriers do not follow a single trajectory but cluster around recurring logics. Some primarily regulate mobility, others consolidate territorial authority, while still others produce ecological externalities or enable alternative forms of cross-border governance. The Berlin Wall, as a historical archetype, highlights the continuity between past and present forms of border materialization while also underscoring their transformation. Ultimately, the taxonomy demonstrates that materially similar infrastructures can serve profoundly different geopolitical purposes depending on the contexts in which they emerge.

4.1 From Physical Barriers to Mental Walls

One of the most significant patterns emerging from the comparative analysis is the progressive shift from the materiality of walls to their symbolic and psychological dimensions. While border infrastructures are often justified in technical or security terms, their long-term impact frequently exceeds their physical function. In many cases, walls endure less as spatial obstacles than as symbolic devices that reshape political imaginaries, territorial perceptions, and collective identities. The most emblematic example of this transformation is found in the history of the Berlin Wall and the former East–West German divide. Although the physical barrier was dismantled in 1989, its symbolic legacy persists in what is often described as the “wall in the head” (*Mauer im Kopf*). This expression captures the persistence of socio-political and psychological divisions long after the material structure disappeared. The German case demonstrates that removing a physical barrier does not automatically dissolve the symbolic geographies it produces. Instead, borders can survive as mental and cultural constructs, shaping perceptions of belonging, identity, and difference across generations. In the contemporary context, the USA–Mexico wall illustrates a different but related dimension of symbolic bordering. Here, the barrier operates simultaneously as a control infrastructure and as a powerful political symbol. Its visibility transforms it into a performative device through which sovereignty is publicly staged.

Beyond its technical function as a filtering mechanism, the wall projects a symbolic message of exclusion and territorial authority that resonates deeply within domestic political discourse. In this sense, the wall’s significance lies not only in its material presence but in its capacity to produce meaning, shaping how borders are imagined and narrated. The Białowieża border wall further complicates the relationship between materiality and symbolism by demonstrating how multiple narratives can converge around a single infrastructure. In this transboundary forest region, the physical barrier becomes a site where discourses of national security intersect with claims of ecological protection and geopolitical rivalry. The wall thus operates as a symbolic anchor that translates abstract political tensions into a tangible spatial form. Rather than functioning solely as a defensive tool, the barrier transforms the landscape into a

contested geopolitical stage, illustrating how material borders can amplify symbolic conflicts.

Finally, the transition from material to symbolic bordering does not necessarily follow a negative trajectory. The Binntal–Veglia–Devero transboundary park provides an example of symbolic reconfiguration in a constructive direction. In this case, the border is not reinforced but reframed: it ceases to function as a line of exclusion and becomes a space of cooperation and shared ecological governance. This shift demonstrates that the symbolic dimension of borders is not fixed but politically malleable. Just as walls can generate enduring mental divisions, borders can also be reimagined as sites of connectivity and mutual stewardship.

4.2 Impacts on Conflict and Territorial Perception

Border barriers reshape conflicts less by blocking movement than by transforming how space is perceived and governed. Once materialized, a wall reorganizes the territorial environment: it stabilizes lines of control, structures everyday practices, and produces new spatial realities that influence how actors interpret contested landscapes. In this sense, borders operate as instruments of territorial production rather than passive markers of separation (Raffestin, 1980). Across the cases examined, barriers consistently alter the political readability of space, embedding power relations into geography. In Western Sahara, the berm exemplifies the consolidating function of barriers. Rather than resolving the sovereignty dispute, it translates political claims into a durable spatial order. The wall creates routinized patterns of control and movement that normalize division over time, transforming an unresolved conflict into a stabilized territorial configuration. This dynamic reflects Raffestin's view that territory is produced through spatial practices that materialize power, making sovereignty appear geographically self-evident even when legally contested (Raffestin, 1980).

A different mechanism emerges along the India–Bangladesh border, where the barrier primarily reshapes perception rather than territorial control. Here, the fence contributes to the normalization of insecurity by framing the borderland as a permanent zone of vigilance. The material presence of the wall reinforces narratives of demographic threat and transforms relational border spaces into sites of suspicion. This process

aligns with Paasi's understanding of borders as institutionalized social constructs that shape collective imaginaries and identities (Paasi, 1998). The result is not a frozen dispute but a continuously securitized frontier.

The Białowieża case illustrates a more hybrid configuration in which materiality amplifies symbolic conflict. The barrier reframes a historically shared ecosystem as a geopolitical interface, anchoring competing narratives of sovereignty, security, and environmental protection to a visible structure. In this sense, the wall functions not only as infrastructure but as a performative device that stages authority and stabilizes particular interpretations of space (Brown, 2010). By attaching abstract rivalry to a concrete landscape, the barrier transforms territorial perception itself, turning an ecological continuum into a politicized frontier. In contrast, the Binntal–Veglia–Devero transboundary park demonstrates that territorial perception is not mechanically determined by material borders. Here, cooperative governance reshapes the meaning of the boundary without erasing it. The frontier persists institutionally but loses its centrality as a line of division, giving way to a spatial imaginary grounded in continuity and shared stewardship. This case supports the borderscape perspective, which emphasizes that bordering practices can institutionalize alternative spatial narratives based on connectivity rather than exclusion (Brambilla, 2015; Giaccaglia, 2024).

The comparison reveals a common pattern: walls sediment political meanings into space. They can consolidate control (Western Sahara), normalize suspicion (India–Bangladesh), intensify symbolic rivalry (Białowieża), or, under different governance frameworks, be re-signified toward cooperation (Binntal–Veglia–Devero). As Brown argues, walls endure not because of their technical effectiveness but because of their symbolic capacity to materialize sovereignty (Brown, 2010). Yet the Alpine case suggests that this process is not inevitable: territorial perception remains historically contingent and politically negotiable.

4.3 Patterns and Divergences

The comparative analysis highlights that contemporary border barriers do not produce uniform outcomes but structured effects that vary across political contexts. Rather than functioning solely as instruments of separation, walls act as spatial operators that embed specific meanings into territory. Across the cases, three recurring patterns emerge. First, barriers can consolidate territorial control by translating contested claims into stable spatial configurations. The Western Sahara berm illustrates how material infrastructures can freeze political disputes into durable geographies, reinforcing Raffestin's argument that territory is produced through the spatialization of power (Raffestin, 1980). In such contexts, walls stabilize authority by transforming fluid conflicts into structured territorial realities.

Second, barriers can reshape perception by institutionalizing insecurity. Along the India–Bangladesh border, the fence does not merely regulate mobility but reframes the borderland as a permanent zone of vigilance. This dynamic reflects the institutionalization of borders described by Paasi, whereby spatial practices reinforce collective imaginaries of threat and alterity (Paasi, 1998). Here, the wall sustains conflict symbolically even where territorial lines appear fixed.

Third, barriers may function as symbolic accelerators, intensifying the political meaning of space. The Białowieża case shows how material infrastructures can anchor competing narratives—security, sovereignty, and environmental protection—within a single landscape. In line with Brown's interpretation, the wall operates as a performative device that stages authority and consolidates particular territorial imaginaries (Brown, 2010). Yet the comparison also reveals a crucial divergence. The Binntal–Veglia–Devero transboundary park demonstrates that the relationship between borders and territorial perception is not deterministic. Through cooperative governance, the boundary is re-signified rather than reinforced, supporting borderscape approaches that emphasize the malleability of spatial meanings (Brambilla, 2015; Giaccaglia, 2024). In this context, the frontier shifts from a line of exclusion to a framework for shared stewardship. Ultimately, the key insight is that walls do not merely divide space—they reorganize how it is imagined, governed, and contested. Their power lies less in physical obstruction than in their capacity to

sediment political meanings into geography. At the same time, the Alpine counter-case suggests that territorial perception remains historically contingent and politically negotiable. Borders, even when materialized, are not final outcomes but ongoing spatial processes shaped by power, narratives, and governance choices.

5. Conclusions

The comparative analysis conducted in this thesis highlights that contemporary border barriers cannot be interpreted through a single explanatory framework. Although these infrastructures are often presented in political discourse as instruments of security or migration control, the case studies examined reveal a far more heterogeneous reality. Each border barrier emerges within a specific geopolitical context and responds to distinct political dynamics. The comparison between the selected cases illustrates how border infrastructures are closely shaped by the historical, political, and geographical conditions in which they develop. In some contexts, border barriers are directly linked to unresolved territorial disputes and long-standing geopolitical conflicts. In others, they emerge primarily in response to migration pressures or domestic political debates surrounding border control. In still other cases, border infrastructures interact with environmental landscapes and cross-border regions, producing complex spatial effects that go beyond their initial political objectives.

These variations demonstrate that border barriers cannot be understood simply as standardized tools of territorial control. Rather, they represent context-dependent political projects that reflect the priorities, constraints, and strategic narratives of the states that construct them. The material form of the barrier may appear similar across different regions, yet the political meanings attached to it can vary significantly. The comparative perspective adopted in this study therefore underscores the importance of examining border infrastructures within their specific geopolitical settings. Doing so makes it possible to move beyond generalized interpretations and to recognize the diversity of bordering practices that characterize the contemporary international system. At the same time, the analysis suggests that border barriers often generate consequences that extend beyond the intentions of the actors who construct them. Their presence can influence local territorial perceptions, reshape spatial interactions in border regions, and contribute to redefining how political boundaries are experienced and represented. In this sense, border infrastructures participate in broader processes through which space, authority, and mobility are negotiated. The findings of this thesis highlight the continuing relevance of territorial practices in the organization of contemporary political space. Understanding how border barriers operate in

different contexts therefore remains essential for interpreting the evolving relationship between territory, power, and spatial governance in the twenty-first century.

5.1 Limitations of the Study

Like any research project, this thesis is subject to a number of methodological and analytical limitations that must be acknowledged in order to clarify its scope and interpretative boundaries. First, the study adopts a qualitative and comparative approach based primarily on secondary sources. While this allows for a broad and theoretically informed analysis of multiple case studies, it limits the possibility of direct empirical verification through fieldwork, interviews, or primary archival research. The findings therefore rely on the existing scholarly literature, institutional reports, and publicly available materials, which may reflect particular interpretative biases or gaps.

Second, the selection of case studies, although guided by clear criteria of functional diversity and geopolitical relevance, inevitably involves a degree of selectivity. The cases included do not aim to provide an exhaustive global mapping of border barriers, but rather to illustrate different configurations of securitarian, military, ecological, and symbolic functions. As a result, the conclusions drawn from the analysis should not be interpreted as universally generalizable, but as analytically grounded within the chosen comparative framework.

Third, the thesis focuses primarily on state-driven border infrastructures. While acknowledging the role of non-state actors, local communities, and transnational dynamics, the analysis remains centered on the geopolitical logics underpinning state practices of bordering. This emphasis may underrepresent grassroots perspectives or everyday lived experiences of borderland populations. Finally, the research is temporally situated in the early decades of the twenty-first century. Given the rapidly evolving nature of border technologies, migration dynamics, and geopolitical conflicts, some developments may transform the configurations described here. The study therefore offers a theoretically grounded interpretation of a specific historical moment rather than a definitive account of future border transformations. Recognizing these limitations does not diminish the relevance of the analysis; rather, it clarifies its

methodological positioning and contributes to a more transparent and reflexive understanding of the research process.

5.2 Future Perspectives on Borders in the Twenty-First Century

Looking ahead, the persistence and expansion of border fortifications suggest that borders will continue to play a significant role in shaping contemporary geopolitical landscapes. Contrary to earlier expectations that globalization would progressively reduce the importance of territorial boundaries, recent developments indicate that states still rely on territorial strategies to regulate mobility and address perceived security challenges. As Jones (2012) notes, the construction of large-scale border barriers in several regions of the world reflects the enduring importance of territorial control within the political organization of modern states. Empirical evidence confirms this broader trend. Since the end of the Cold War, the number of physical border barriers worldwide has increased dramatically. While only a small number of walls existed in the early 1990s, more than seventy border barriers have been constructed or planned globally in the past three decades (Jones, 2012; Vallet, 2018). These infrastructures range from large-scale fortifications such as the India–Bangladesh border fence and the Moroccan berm to technologically advanced surveillance systems along the United States–Mexico border and the external borders of the European Union. This proliferation suggests that territorial bordering remains a central strategy through which states attempt to manage mobility and demonstrate political authority. At the same time, future bordering practices are likely to evolve beyond the construction of traditional physical barriers alone.

Technological innovation is increasingly transforming the ways in which states monitor and regulate cross-border movement. Surveillance infrastructures, biometric identification systems, satellite monitoring, and digital databases are progressively integrated into border governance. In recent years, states and international organizations have invested heavily in the development of so-called “smart borders,” which combine advanced surveillance technologies, biometric identification systems, and large-scale data analytics in order to enhance security while simultaneously facilitating the movement of legitimate travelers and goods (Mau, 2019; European Commission, 2023). Rather than relying solely on traditional physical barriers,

contemporary border management increasingly integrates digital infrastructures capable of monitoring mobility in real time.

Artificial intelligence has become a central component of modern border control systems. AI-driven algorithms allow authorities to analyze vast datasets related to travel patterns, passenger information, and security intelligence in order to detect anomalies and assess potential risks before individuals reach the physical border itself (ICMPD, 2021). Through predictive risk assessment systems, border agencies are able to identify high-risk movements and allocate resources accordingly, allowing low-risk travelers to pass more quickly while directing greater scrutiny toward individuals flagged by automated systems. In this sense, border governance increasingly shifts from purely territorial control toward data-driven management of mobility. Biometric technologies also play a key role in the development of smart border systems. Facial recognition, fingerprint identification, and iris-scanning technologies are progressively replacing traditional passport-based checks at many international borders. Several airports worldwide have already implemented biometric “walk-through” gates that allow travelers to cross border checkpoints without presenting physical documents, relying instead on digital identity verification systems (European Commission, 2023). These technologies significantly reduce processing times while enhancing the accuracy of identity verification by linking biometric data to centralized digital databases.

Beyond checkpoints, border surveillance infrastructures are also expanding across remote border regions. Contemporary monitoring systems increasingly include unmanned aerial vehicles (drones), ground sensors, radar technologies, and thermal imaging cameras capable of detecting movement across vast and difficult terrains (Bigo, 2014). These technologies create what security scholars describe as “layered surveillance systems,” in which multiple monitoring tools operate simultaneously in order to maintain continuous situational awareness across border zones. Another important development concerns the creation of integrated data infrastructures and centralized command centers. Modern border governance increasingly relies on the fusion of multiple data streams—including biometric databases, travel records, intelligence networks, and surveillance feeds—into unified operational platforms that provide authorities with a real-time overview of border

activity (Mau, 2019). Such systems enable faster and more coordinated responses to potential threats and illustrate how borders are gradually evolving into complex digital infrastructures extending well beyond the physical boundary line. Despite these technological advances, the expansion of smart border systems also raises important ethical and political concerns. Scholars and policy analysts have highlighted potential risks related to large-scale biometric data collection, including questions regarding privacy protection, algorithmic bias, and the transparency of automated decision-making processes (Bigo, 2014; Mau, 2019). Furthermore, the increasing reliance on digital surveillance infrastructures may reinforce asymmetrical mobility regimes in which certain groups—particularly migrants and asylum seekers—are subjected to more intensive monitoring and control. In addition to privacy concerns, technologically enhanced border control may also produce unintended humanitarian consequences. Several studies have shown that the strengthening of border surveillance systems often redirects migration routes toward more dangerous and remote areas, increasing the risks faced by migrants attempting irregular crossings (Jones, 2012). In this sense, the technological “smartification” of borders does not necessarily eliminate migration pressures but instead reshapes the spatial dynamics through which migration occurs. Consequently, while smart border technologies promise improved efficiency and enhanced security, their broader social and political implications remain contested. The challenge for policymakers will therefore be to reconcile technological innovation with the protection of fundamental rights, transparency in data governance, and international cooperation in migration management.

In addition to technological innovation and evolving security strategies, environmental transformations are likely to play an increasingly important role in shaping the future of borders. While border infrastructures have traditionally been analyzed through geopolitical and security perspectives, growing environmental pressures are beginning to influence how states conceive and manage territorial boundaries. Climate change, biodiversity loss, and resource scarcity are gradually transforming border regions into spaces where environmental governance and territorial control intersect. Scientific observations increasingly highlight significant transformations in environmental systems across several regions of the world. In particular, studies document substantial

changes in snow cover, glacial systems, and broader environmental dynamics, raising important questions about the geopolitical implications of environmental change (Meoni, 2025). These transformations may alter access to natural resources, reshape environmental landscapes, and generate new forms of spatial uncertainty in border regions.

At the same time, many environmental processes operate across political boundaries and therefore challenge traditional territorial approaches to governance. Transboundary water systems, atmospheric circulation, and shared ecosystems illustrate how ecological dynamics frequently extend beyond national borders, requiring forms of international cooperation that are not always easily reconciled with state-centered approaches to territorial control (Zeitoun & Warner, 2006).

Environmental considerations are also beginning to influence global economic governance through emerging regulatory mechanisms that intersect with border management. One notable example is the introduction of climate-related trade policies such as carbon border adjustments, designed to prevent the relocation of carbon-intensive production to countries with weaker environmental regulations (European Commission, 2023). These mechanisms suggest that borders may increasingly function not only as instruments of territorial control but also as regulatory interfaces through which environmental standards are enforced in global trade.

The growing reliance on border fortifications has generated significant debates within the academic literature. Some scholars argue that the exclusionary practices associated with hardened borders may conflict with the democratic values that many states claim to defend. Jones (2012) highlights how the forms of exclusion and coercion required to enforce border walls can ultimately undermine the very ideals of freedom and democracy that such infrastructures are often intended to protect.

The future of borders will likely depend on the ability of states and international institutions to balance security objectives with broader commitments to human rights, environmental protection, and international cooperation. These developments suggest that borders are unlikely to disappear in the foreseeable future. Instead, they will continue to evolve in response to changing political priorities, technological innovations, and environmental pressures. Understanding these transformations will therefore remain essential for interpreting how states organize territory, regulate

mobility, and exercise authority in an increasingly interconnected yet politically fragmented world. Ultimately, rather than fading in the age of globalization, borders appear to be adapting to new geopolitical realities, remaining central to the ways in which sovereignty, security, and mobility are negotiated in the twenty-first century.

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